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## T460/461/462 Remote A/V System Controller Software release V3.84 part A

Ed Schoell 9th Sept, 2015

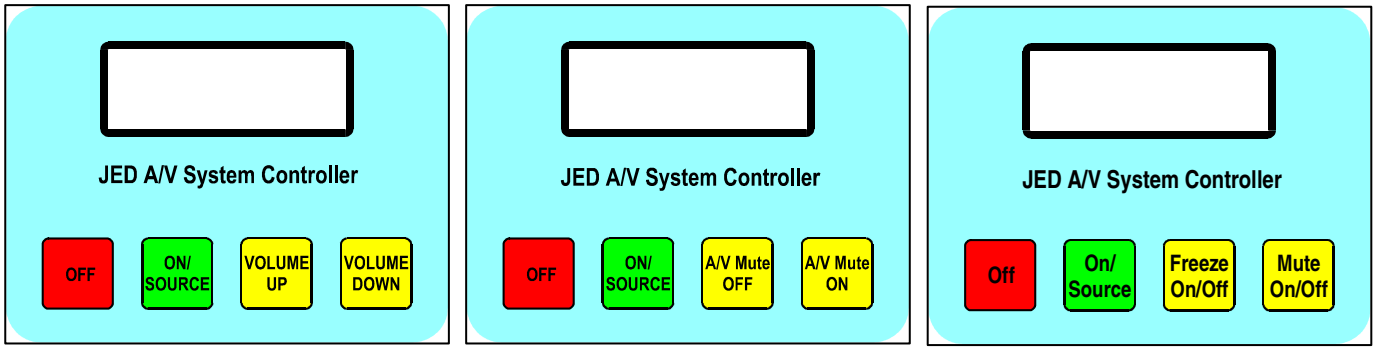
The T460 controller is a remote control device with four push-button keys and an LCD display designed to remotely control LCD/DLP video data projectors, plasma and LCD screens via the RS232 serial data input of the projector or screen.

As well, the T460 can control JED's remote audio attenuator (and relay) rack-mounted box, the T461. This is via a (second) RS232 channel. If no T461 audio control is needed, the second serial port can be used to control one or two T462 relay boxes.

The front of the T460 has a 2 line by 12 character LCD display, and this displays the system status, and in the "running" mode, the currently selected projector/screen signal source and the current audio volume setting or mute/freeze.

**Release V3.76** Add BenQ LCD: RP550+, RP551+, RP650+, RP651+, RP700+, RP840G, Add DVI-A and DVI-I to Optoma via FLAGJ/K **V3.77** Add NEC LCD X464UN_UNV, P553, X554UN_UNS, P703, HDbaseT to Epson EB-G6900 etc **V3.78** Drop lots of old Hitachi's. Add Hitachi CP-X9110, CP-X9111, CP-WX9210, CP-WX9211, CP-WU9410, CP-WU9411, CP-WU8460, CP-X8170, CP-X4030WN, CP-WX3530WN, CP-WX/X4022WN, CP-X5022WN, CP-WX8265, CANON LV8235UST, Add NEC UM301W/X, UM351W, UM361X, PA521U, PA571W, PA621U/X, PA671W, PA721X, PX602U/W **V3.79** Add FLAGT control of backlight. **V3.80** Add Optoma W316, Reply mode on Panasonic proj, EPSON EB-W28, Ch 5 command USB Display on NEC (FLAGK = 1), Epson: IF (FLAGJ = 1) AND (FLAGK = 0) Select Ch 4 command SCREEN MIRROR, Epson: IF (FLAGJ = 0) AND (FLAGK = 1) Select Ch 4 command USB Display. **V3.81** Add Philips BDL 1.86 codes, 1.88 codes (with address byte). Whiteboard on Epson. **V3.82** Add Christie Generic E,G: E series: DHD675-E, DWU675-E, DHD775-E, DWU775-E, G series: DHD550-G, DWU550-G, DWX600-G, DHD600-G, DWU600-G ' **V3.83** Add Samsung HG special for SAMSUNG HG to keep TV looking for commands, uses FlagU, **V3.84** Add FlagV for sub of Plug In Module for Samsung on Ch 8

**T460 keyboard options:** Three layouts are currently supported:




**"Volume" keyboard** **"Mute" keyboard** **"Mute/Freeze" keyboard**

The "Volume" keyboard has an option of a beige background, or a metallic keyboard with a surrounding darker metallised bezel.

| **All keyboards have the first two keys labelled:** | |
|---|---|
| • **OFF:** This ends a display session; | |
| • **ON/SOURCE:** Starts a display session, and when running, selects the source of display data. | |
| **On a "Volume" keyboard:** | **On a "Mute/Freeze" keyboard:** |
| • **VOLUME UP**: Increments the sound volume level; | • **Freeze On/Off** toggles the picture freeze; |
| • **VOLUME DOWN:** Decrements the sound volume. | • **Mute On/Off** toggles picture/sound mute. |

| **On a "Mute" keyboard:** |
|---|
| • **A/V Mute ON** mutes the picture and sound; |
| • **A/V Mute OFF** restores the picture and sound. |

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# T460 Operation

On startup, the following sequence of information is shown at 2-second intervals:

- Identification of device as JED Projector/Plasma/LCD controller;
- **T460 V2.xx**, the version number of this release of the controller software;
- The Projector/Plasma/LCD manufacturer and model number for which the T460 is currently configured;
- A message indicating a successful poll of the Projector/Plasma/LCD to see if it is on and communicating (or not);
- On quite a few projectors (types with remote lamp reading), the total lamp hour reading; and
- If the T460 is configured to use the T461 remote audio attenuator, or the IN400 switcher/amp, a message indicating successful communication with it (or not); (If a T462R2 or R4 is detected, this is shown here.)

**Note: The above information can be viewed any time by pressing both the VOLUME UP and VOLUME DOWN keys at the same time. This is useful as a quick system status check before a show or lecture.**

The display then shows the startup screen and turns the backlight OFF after 2 seconds, waiting for the **ON/SOURCE** key:

```
Projector     (or Plasma or LCD)
ON to start
```

The **ON/SOURCE** key sends a "powerup" command to the projector/screen the first time that it is pressed. The last-used source is remembered and selected as the default source. The backlight is switched ON.

During the warm-up time, the desired source can be pre-selected by pressing the **ON/SOURCE** key. For projectors/screens that require a timed warm-up period, the time of this warm-up counts down in seconds on the screen. (For projectors/screens that time the warm-up internally and the T460 is used in "reply" mode, no time is displayed, and the projector and T460 automatically enter the RUN mode when the projector/screen signals "ready" status.)

```
Video
Warmup 17
```

Once in RUN mode, the display shows the current source on the top line and volume message on the lower line:

```
Video
Volume 15
```

On subsequent **ON/SOURCE** key pressings, this display scrolls through the allowed channels of signal sources, however many there are.

**Pressing the ON/SOURCE key (for as long as you like), and RELEASING it for less than one second,** rapidly advances to the next channel WITHOUT sending a command to the projector/screen, allowing several presses (and SHORT releases) to get to the desired source without waiting for the projector/screen to step through the intermediate channels. When the display (top line) indicates the desired source, the key is released for more than 1 second, the command is sent to the projector/screen and a "Changing please wait" message shows the command system in the projector/screen is busy. During the source stepping process the T460 Channel allocation number is shown on the bottom line of the display, showing what physical channel is used for the allocated source. (These Channel allocation numbers are the same numbers used during setup of "sources" and T461 links, and up to eight channels are available.)

## "Volume Up" and "Volume Down" keyboard

The **VOLUME-UP** and **VOLUME-DOWN** ramp the audio volume up and down for the current channel. With systems having absolute control of volume by the projector/screen or T461 system, the previously set volume for the current channel is remembered and restored between source channel selections, and power-up and power-down operations. With systems only having incremental control of volume in the projector/screen, the lower line of the display shows:

```
Video
Volume +/-
```

The actual setting of the current volume is displayed on the projected video screen (not the T460 LCD screen).

The Volume keys **Auto-Increment/Decrement.** Holding a key down will begin stepping the volume up and down. (There is a pause before this starts, and both the "Pause" time and the "Rate" are programmable in the setup process. The default is a 1-second pause and repeat rates of just under ½ second. These rates can be altered in the setup system)

The Volume keys can be used together as a **MUTE ON/OFF** function (for projectors which have suitable commands).

Press **BOTH** yellow keys together and the LCD screen shows:

```
Picture and
sound muted
```

Pressing either yellow or the green (source) key momentarily restores picture and sound.

The **OFF** key sends a "power-down" command to the projector and shows the "cool-down" message and counts down the cooling period, finishing up back in the "standby" state.

```
Video
Cooldown 43
```

## "A/V Mute On" and "A/V Mute Off" keyboard

If an **"A/V Mute On"** and **"A/V Mute Off"** function keyboard is installed, the screen shown when running is:

```
Video
System is ON
```

Pushing the **AV Mute On** key will mute the sound and turn the picture to black. The projector/screen will continue to run and be ready for an instant restart.

When muted, the following message is displayed:

```
Video
System muted
```

Pressing the **A/V Mute Off** restores the picture and sound.

(**FLAG3** in the Flags menu selects messages associated with this keyboard. This is normally setup in the factory.)

## "Freeze On/Off" and "Mute On/Off" keyboard

If a **"Freeze On/Off"** and **"Freeze On/Off"** function keyboard is installed, the screen shown when running is:

```
Video
System is ON
```

Pushing the **Freeze On/Off** key will freeze the picture. (If available in that projector/panel model.) When Freeze is active, the following message is displayed:

```
Video
Freeze ON
```

Pressing the **Freeze On/Off** key again restores the picture motion.

Pushing the **Mute On/Off** key will mute the sound and turn the picture to black. The projector/screen will continue to run and be ready for an instant restart.

When muted, the following message is displayed:

```
Video
System muted
```

Pressing the **Mute On/Off** key again restores the picture and sound.

(**FLAG3** in the Flags menu selects messages associated with this keyboard. This is normally setup in the factory.)

Certain projectors do not have absolute commands for Freeze and Mute commands, and no way of polling the projector to determine current state. The same command (a "Toggle" command) is sent whenever either Freeze or Mute buttons are pressed, and the user has to directly observe the big screen to see the Freeze or Mute state.

## Screen control in RUN mode

In run mode, it is possible to manually control the screen. (If enabled, the screen goes down and up with On and Off key presses.) If "Screen Control" is setup as a dummy channel, stepping to it allows the yellow keys to start screen up and down.

The screen-control message shown is:

```
Screen cntrl
via Yel.keys
```

(If no yellow key is pressed at this point, the option times out and the display reverts to the current channel.)

If, at this point, the "Volume Up" key is pressed (to raise the screen), the "screen up" mode is entered. If the screen drive is "timed", the user is then offered a mute option:

```
Press Vol up
key for mute
```

(If it is not "timed", the screen motion starts before the "mute" message)

This mute message will show for 5 seconds and then revert to the current channel while the screen moves (or if it is "timed" the screen timing will count down).

If the screen is up, and the "Volume Down" key is pressed, the screen moves down (showing the count-down if it is "timed".)

## Aspect ratio control in RUN mode

The aspect ratio of the display of many projectors and flat panels can be changed by the user in RUN mode if a dummy channel (or two) is programmed appropriately. The user simply steps to that dummy channel (with the green "source" key) and leaves display on the screen.

**The availability of aspect ratio setting, and which commands are supported is indicated on the projector-specific pages**.

The aspect ratio message is sent and the display reverts to the current channel after two seconds. There are two modes for this:

- Roll mode: If the display is set to and shows:

```
4:3/16:9/Zm.
Channel: 8
```

The screen aspect ratio and/or zoom setting will be rolled through the available options. (Repeat for the next available ration.)

- Setting mode: If absolute aspect settings are provided, the aspect ratio is set directly, and two or three dummy channels need to be allocated. The display looks like:

```
Set small4:3
(or)
Set reg 4:3
(or)
Set reg 16:9
```

These options select the indicated ratios and the display reverts to the current channel after two seconds.

## Microphone level control in both Standby and RUN mode (via T461 audio controller)

If this is enabled in the "Set channels", "Set audio" and "Set Flags" menus, the T460 will control a line-level microphone level via the yellow volume control keys (and the fourth channel of the T461 audio controller). The "standby" message screen is:

```
Microphone
ON to start
```

It can turn on and set the level of microphone audio even though the projector is Off. Pressing the ON button shows:

```
ON for Proj.
Mic.Vol: 12
```

Microphone audio can then be turned Off with the OFF key or the projector turned On with the ON key. Pressing the ON button shows the normal warm-up sequence.

The microphone is kept active during projector warm-up, and can be adjusted at any time after warm-up by switching the T460 to a dummy channel (maybe 7 or 8) setup for microphone control and using the yellow Volume Up/Down keys:

```
Mic.Vol.set
Mic.Vol: 12
```

The T460 will stay on the microphone channel for 5 seconds after the last adjustment is made, or can be returned immediately to the display channel by pressing the ON key.

If the microphone level is set to zero, the T460 state returns to the first state above ("Microphone ON to start") with the microphone OFF. If an active level was being used when the OFF button was pressed, the microphone is kept active during projector cool-down, and the T460 returns to the second screen above and the level can be adjusted. Pressing OFF turns of the microphone. (Pressing ON would turn the projector ON again.)

## Split screen for Mitsubishi in RUN mode

Moving to the channel labelled "Split/Unsplt" sends a screen spit command to this projector. Sending it again un-splits the screen. Changing sources will also clear the Split mode. The display reverts to the current channel after two seconds.

## Setup of T460 system

Setup of the system can be made from the keyboard using a menu accessed via a pin number. This allows:

- The projector/screen type to be set, along with the communications mode;
- The sources selected for each active input channel;
- The audio control mode (projector/T461) selected or MUTE control selected;
- The timeout period be set for the power-down if not manually turned OFF;
- The PIN number for access to the setup screen altered; and
- The contrast/viewing angle of the LCD display in the controller adjusted.

An “Exit” screen returns the unit to normal operation. All settings are remembered in non-volatile internal memory and recalled even if power is removed.

## On Power-up

On power-up, the controller turns on the LCD backlight, shows an identification screen, shows the projector/screen type preselected, and then shows the operator start screen:

```
Projector
ON to start
```

## PIN number access to the setup system

The setup system is accessed by pressing AND HOLDING DOWN the **OFF** key first, and then pressing and releasing the **ON/SOURCE** key, with the **OFF** key STILL HELD DOWN. (Otherwise an unwanted projector/screen startup cycle begins).

```
PIN= 1***
Inc. ↑
```

The arrow ^ shows the digit being set, and pushing the **VOLUME UP** key increments this digit to the desired value.

```
PIN= 1***
Inc. ↑
```

When at the right value for that digit, pressing the **VOLUME DOWN** key moves the arrow to the next digit:

```
PIN= 10**
Inc.  ↑
```

and so on through all four digits:

```
PIN= 106*
Inc.   ↑
```

and:

```
PIN= 1066
Inc.    ↑
```

The last press of **VOLUME DOWN** shows the result:

```
Invalid PIN
```

If incorrect, or:

```
Valid PIN
```

If correct.

**NOTE: The example code, 1066 is the default PIN number. For security, you should reset this to a four-digit number of your choice. See “Set PIN no” section of this manual for details of how to do this.**
**(Some units are preset with other default PIN numbers.)**

## Inside the Setup system

Once the setup system is entered, the following two prompt screens alternate, and one should then push **ON/SOURCE** to cycle through the following screens, allowing functions to be preset. (Vx.xx is the release version of the software.)

```
J460 Vx.xx
On selects
```

```
Vol Dn acts
Off exits
```

**Exit from the setup screen is done by pressing and holding OFF key.**

**ON scrolls down the menu , and VOL UP scrolls back up.**

**VOL DOWN enters a selection, and OFF once returns to the top, or following parameters (PIN no, times, etc.)**

**Pressing OFF again for two seconds exits to run mode.**

## *One ON press:* Set Projector type and reply mode

The first option offered sets the projector type:

```
Set Proj.
Vol Dn acts
```

Pressing **VOLUME DOWN** shows:

```
Select proj.
```

The currently selected projector manufacturer and type is displayed:

```
Proj. type:
Hit:CP-X985
```

Pressing the **ON** key scrolls through the manufacturers by name and major sub-group within a manufacturer (eg NEC GT, MT, VT). **VOLUME UP** scrolls through the individual models. The **VOLUME DOWN** key backs up the manufacturer and major sub-group, so if you overstep a model, you can back up one or more blocks and then step by model again with **VOLUME UP** to get to the actual model without going through all 500 plus models.

Pressing the **OFF** key sets that type and proceeds to reply mode setting:

```
Proj set to:
Hit:CP-X985
```

## Reply mode setting

The next screen shows the current reply mode. This is a configuration setting in the T460 that determines whether the T460 updates and displays its status from feedback from the projector/screen or by just sending out commands and determining warm-up and cool-down times internally. For some projector/screens, both modes are provided, and the preferred mode, if available, is to use REPLY MODE, as this gives shorter times and continuous feedback. However, some projectors/screens for various technical reasons are unable to support this mode, and so must be used always in NO REPLY mode.

In some setups, e.g. where multiple identical projectors/screens are being controlled in parallel, because feedback from several projectors/screens cannot all be read back, only outgoing data must be wired from the T460 to the projectors/screens, and no return RS232 connected. The controller must be operated in NO REPLY mode. This is selected in the third menu.

If NO-REPLY is the only allowable mode, no options are offered; instead the information screen is shown:

```
Rep mode set
:no reply
```

and the setup goes back to the main setup entry screen without waiting.

If an option on reply mode is available, the screen shows:

```
Set Project.
reply mode
```

pauses, and then shows the current setting:

```
Reply mode:
reply used
```
(or)
```
Reply mode:
no reply
```

Pushing **VOLUME UP** will toggle between these two options.

Pushing **OFF** will select one of these, and show the `Rep mode set` screen above and exit to the main setup entry screen, and saves the selections.

### *Two ON presses:* Set Sources for channels, set Default channel

Moving to the Set Channels screen shows:

```
Set channels
Vol Dn acts
```

and pressing **VOLUME DOWN** enters this setup group:

```
Set Ch. 1 as
RGB1
```

then pressing **VOLUME UP** scrolls through available sources on the bottom line:

```
Set Ch. 1 as
Computer 1
```

Pressing **VOLUME DOWN** scrolls through the channels and their selected sources:

```
Set Ch. 2 as
Skip
```
and:
```
Set Ch. 3 as
Video
```

and so on, for all 8 channels.

The "Skip" selection means that the channel is skipped when in the run mode and the **ON/SOURCE** key rolls through channels and their sources. Be sure to set unused channels to "Skip". (8 new channels added before "skip" in rev 3.37.)

**Note: If a suitable name is NOT found from the list of over 100 provided, users to add up to four of their own chosen names to the list, changing the four called "User name 1" to "User name 4" to whatever is desired, up to 12 characters per name.** These names are located after the name "Viewer" in the alphabetically-arranged list. Umlaut characters are also provided for foreign languages. See the "**Set Names**" setting menu item later in this manual.

(In the Channel Select via Yellow Keys mode, channels can be "Selected" or "Deselected" for use. A Default Channel can then be set in this mode too. See next heading)

Pressing **OFF** gives the option of setting up a "default" channel. If **OFF** is simply pressed again, this message shows:

```
No default
channel set
```

and the system returns to the main setup entry screen.

The **VOLUME DN** key rolls around all 8 channels and back to the "No default channel set" message e.g.:

```
Channel 2
as default
```

Pressing **OFF** saves the chosen default, so the projectors/screen always returns to a preset channel instead of the last one used.

**Users can check the channel allocations during running mode by pressing the ON/SOURCE key and noting the channel number below the source display, visible for 1 second before the projectors/screen changes channels.**

### Special channel selection process for green key in Channel Select via Yellow Keys mode

If Channel Select via Yellow Keys is selected in the third (Audio/Mute menu) then instead of the Set Default menu above (on exit from Channel Set), the prompt shows:

```
Channel 1
selected
```

or

```
Channel 1
deselected
```

The selected/deselected is done via the **VOLUME UP** key. The channels are incremented with the **VOLUME DN** key. Press **OFF** to save and enter Default Set menu covered in the preceding paragraph.

In this mode, the two yellow keys move to immediate pre-programmed channels and the Green/On key shows only one or rolls between several preselected keys as selected in this menu.

## Special Sources for mute, screen size, screen-up/down, "split" screen & audio setting

A number of extra "Sources" have been added to the normal source names entered with the menu above. These are after the last in the alphabetic list (Video specials) and are used to set special functions, which can be selected as if they were a "Source," but do other things. All that you need to do is set these labels to otherwise **unused** channels:

- **"Pic/Snd Mute"**: This looks like a source but mutes sound and picture. This provides an alternative to using the yellow volume/mute control keys in systems where audio control is needed (via projector/screen or T461) but a mute function is also needed. All that you need to do is set this label to an **unused** channel, and when you select it, mute happens. Pressing **ON** goes back to the previous source and un-mutes the system. In **Pic/Snd Mute** mode, the screen shows:

```
Picture and
sound muted
```

- **"Aux. Audio", "Cass. Audio", "CD audio", "Tape audio", "Mic. Audio"**: These all allow a T461 to control audio (ie switch to a channel and control volume) to a PA system while the projector/screen video/sound is muted;
- **"Set small4:3", "Set reg 4:3"** and "**Set reg 16:9":** These set screen widths to selected ratios for Sanyo, Eiki, Hitachi projectors. Select either of these channels to switch video display modes. Messages show the selection operation as it happens. After 2 seconds the system returns to the current source input (Video, etc);
- **Special "Source" to set screen size for Proxima**
  A number of extra "channels" have been added to the normal channel names entered with the menu above for the Proxima. These set modes for Video and S-Video for screen sizes. Names are: "S-VHS-Native", "S-VHS-16:9", "S-VHS-4:3", "Video-Native", "Video-16:9", "Video-4:3". These send special code sequences to the projector/screen to set up the modes, eg for theatre use. The projector remembers and restores the previous source setting;
- **Special "Source" to set screen size for Plus**
  An extra "channel" has been added to switch screen sizes for the Plus projector. Because there is no read-back of current status from a Plus projector, this "Source" called **"4:3/16:9/Zm"** rolls through 4:3, 16:9, Zoom. The projector remembers and restores the previous source setting;
- **Special source "Screen cntrl" to allow screen control in "run" mode**
  This extra channel allows screen down/up in run mode. It also offers option of picture/sound MUTE when the screen is up;
- **Special source "Split/Unsplt" to allow spit screen mode for Mitsubishi FL7000 projector**
  This projector allows a wide screen to be split into a Computer part and a Video part simultaneously;
- **Special source "DVD: Control" for DVD player control;**

A special channel called **"DVD: Control"** can be used to send **"PL<CR>"** (Play) and **"RJ<CR>"** (Reject) commands to a Pioneer Industrial DVD player, models DVD-V7300V or DVD-V7400V players. This communications is from RS232 Serial port 2 (the same as the "download" or T461 port, so this cannot be used with a T461 in the same installation).

This DVD control is included mainly for "automatic" installations, e.g. ones started and stopped by a timer or started by a PIR people detector or a customer-actuated push button (and stopped by a timeout or the internal "Runtime" timer.) The **"DVD: Control"** channel should be left selected after testing and powering down, to save it as the default on the next start. The command to start the DVD is only sent after the warm-up period has counted out, so that the start of the show is visible, and the command to stop is sent on Timer (internal or external) timeout prior to cool-down. (or when the OFF key is pressed.)

Setup staff can change these sequences for different DVD players, or if different strings are needed, eg to "seek" to a specific track prior to playing: **see the EE-Edit command in the setup system of this manual**. Baud rate and code string for ON and code string for OFF can be changed or added to. See the Pioneer RS232 protocol manual for the player in use. When preparing DVDs for playing continuously (e.g. in a museum), repeat commands need to be embedded.

This command, **"DVD: Control"**, should be selected to a Video or S-Video channel chosen to match the wiring from the DVD to the projector/screen. Choose the channel from the projector/screen-specific data later in this manual.

- **Special source "Mic.Vol.Set" for setting microphone level via Channel 4 of a T461 audio controller.**

This sets up a dummy channel for control of the level of a microphone input to the T461 channel 4. This can be used without the projector running, prior to its turning on, or during warm-up or cool-down. Its operation is described earlier (Page 5).

**NOTE: FLAGM must also be set for this to be operational. (see Flags setting below).** Also set **"T461 runs aux. audio"** in the next "**Audio/Mute"** menu.

## *Three ON presses:* Set audio control system, Freeze/Mute, Aux/Mic. Audio, Ch. override

Moving to the Audio/Mute setup screen shows:

```
Audio/mute
Vol Dn acts
```

Pressing **VOLUME DOWN** enters the audio setup showing current setup:

```
Audio system
via project.   (or alternates)
```

Pressing **OFF** or **VOLUME DOWN** goes back to the main setup entry screen, and saves the selection.

**Note: If no volume display is desired, and no projector/screen volume messages, set Flag3 (see Flags menu).**

If the projector is an **Epson ESC/VP21 family, i.e. EMP-600, -800, -810, -811, -820, TW100, -30/52, -53/54/73/74, -7800, -7850, -7900/7950, -6100/6000/6110, or a newer Hitachi one, it is necessary to set up audio to channel links.** Use of this is discussed in the manufacturer-specific notes below:

- Epson see: **Error! Reference source not found.**;
- Hitachi see: Hitachi projectors.

Pressing **VOLUME UP** or **VOLUME DOWN** circles between audio options of either the via the projector/screen, via 461 rack or, or the options of Mute/Freeze control via the VOLUME keys, as follows:

```
Audio system
via 461 rack
```

Note: you **MUST** set the T461 links via the **"Set T461 Channel Allocations"** menu. Otherwise NOTHING happens!

For selecting the Mute keyboard option, use the following option:

```
Vid mute via
yellow keys
```

This uses the special keyboard with the third key labelled **A/V Mute OFF** and the fourth key labelled **A/V Mute ON. Note: FLAG3 must be set for the correct display messages for this option.)**

For selecting the Freeze On/Off and Mute On/Off keyboard option, use the following option:

```
Freeze/Mute
yellow keys
```

This is for use with the keyboard with the third key labelled **Freeze On/Off** and the fourth key labelled **Mute On/Off.** This keyboard is only be available with projectors/screens with the freeze function accessible via serial communications:

The next item in this menu allows setup of an **Auxiliary Audio** or **Microphone input** mode via the T461. (See description below):

```
T461 runs
aux. audio
```

The next item in this menu allows setup of the yellow keys to do instant channel selections, for use in videoconference applications needing immediate switching. (See more detailed description below):

```
Ch. sel. via
yellow keys
```

The last item in this menu allows setup of the yellow keys to send mono/stereo (3D) commands to be send from the second serial port to a Cyviz 3D Stereo viewing system (This uses two stacked projectors driven in parallel from a special splitter box

and has vertical and horizontal polarising filters on the two projectors. Viewers use polarised glasses.) In this mode, the "AV mute OFF" key sends a OBLN message to view in stereo, and the "AV Mute On" key sends a OBLN message to set mono mode. The lower line on the T460 LCD screen shows the current mode. Setup screen is:

```
2D/3D via
yellow keys
```

The sends special commands for switching between 2D and 3D via a Cyviz XP2 device.

```
Special via
yellow keys
```

This allows for custom serial strings to be sent from EEPROM for special control functions when the yellow keys are pressed. Special messages are also shown on the T460 screen. These messages are hand-loaded into EEPROM at locations 100h upwards in blocks of 16 bytes. (i.e. 100h, 110h, 120h, 130h).

```
A/V switch
via IN400
```

This allows the T460 to control a Hills / Australian Monitor IN400, 8-channel audio mixer / amplifier. Wiring is discussed later in this manual: T460 controller to Australian Monitor (Hills) IN400 wiring**.**

(After selecting this option, installers must then go to the "**IN400 Links**" setup, the 6th menu in the T460 setup system, and set up the relationship between T460 channels and IN400 inputs. (The "IN400 Links menu replaces the T461 menu after the IN400 option is selected in this Audio/Mute menu, so this selection MUST be done first.) A channel re-map option is then offered.

Pressing **OFF** or **VOLUME DOWN** goes back to the main setup entry screen, and saves the selection.

## Auxiliary Audio setup and use … Room audio or microphone without running projector/screen

This function allows users of a combination of a T460 and a T461 (or T441) to use the setup to control an auxiliary audio function, where the T460 and Channel 4 of the T461 can be operated as a room audio volume control **WITHOUT HAVING THE PROJECTOR RUNNING. This includes running a microphone channel.**

Typical connection would be to use a combined DVD/Audio CD player (is there any other kind?) connected into Channel 4 of the T461 and the T461 output drives the room PA system. (Note if using a T441 2-channel stereo mixer, in default "Stereo" mode the two stereo channels are equivalent to T461 channels 1 and 3. To enable this option in a T441 environment, set FLAGN (see Set Flags menu item) to move the selected mixer channel to "3" from "4". Default 2-channel stereo mode assumes all T441 option switches are OFF.) If this "channel 3" is to be used for other inputs, use the T461 mapping menu in "T460 Setup" to map channel to the needed channel.

If this auxiliary audio source is not used in projection mode, the T461 channels 1, 2, and 3 are used for video-related functions and channel 4 is for audio only (CD player, Audio Cassette player, background piped Muzak, etc)

If **FLAGM =0** and, "**T461 runs aux. Audio",** is selected in the audio/mute menu, when the T460 starts, the following screen is shown in place of the "**Projector/Plasma/LCD ON to start"** message in the Off/resting state:

```
Audio system
ON to start
```

When the **ON** key is pressed, the following screen is shown:

```
ON for Proj. (ON:St.Plasma)
Volume 9
```

and the T461 becomes active on channel 4 (T441 is channel 3), allowing a CD player, etc to be run, and the audio signal through the T461/T441 to be controlled by the T460 in exactly the same way as when a video show is running. **The projector/screen does not start, however.** The volume range is 0 … 20.

Pressing the **OFF** key runs T461 channel 4 (T441 channel 3) to a volume of 0, and returns to the "**Audio system ON to start"** screen.

Pressing the **ON** key gives a:

```
Starting
projector   (Plasma)
```

message, and the projector/screen starts and runs as normal.

**If relays for screen operation are installed in the T461, and are setup, they will lower the screen, lower the projector and dim the lights at this time.**

(Pressing the **OFF** key shuts everything down as normal.)

Note: If **FLAGM=1** then the microphone function is enabled in standby mode. To use the microphone in projector ON state, a dummy channel for microphone setting must be made in the channel select menu above (2 ON presses).

## Channel Select via Yellow Keys (or yellow AND green ON key)

The two yellow keys select a channel each, and a third channel can be selected for the ON key immediate switching by setting up a "Default" channel:

Pressing **VOLUME DOWN** enters the setup, and **VOLUME UP** scrolls through the 8 channels for the **U,** or **UP** key:

```
Channel 2
as default U
```

Pressing **OFF** or **VOLUME DOWN** goes to the similar setup for the **D**, or **DOWN** key.

Pressing **OFF** or **VOLUME DOWN** exits.

(If a third immediate channel, (or more channels) are needed for the ON key, set one or more channels for the Green/On key in the setup described at the end of the channel naming section above.)

**Note:** The channels can individually be named in the Set Names menu below.

## *Four ON presses:* Set default Run-time, PIR/Input display

Moving to the Run-time setup screen shows:

```
Set Runtime
Vol Dn acts
```

Pressing **VOLUME DOWN** shows the current timeout setting and the state of the PIR contact input:

```
Run-time|PIR
 0h 10m | on
```

Pressing **VOLUME UP** and **VOLUME DOWN** scroll the Run-time time up/down through values from None and 1m to 16 hours 0 min.

Setting None disables the Run-time timeout function.

Pressing the **OFF** key goes back to the main setup entry screen, and saves the Run-time selected.

**In a new feature added at 1.40 for Hitachi/NEC/Fujitsu, this Run-time is shown to the user when the ON key is pressed to start a show, and the user can then alter the Run-time. This new Run-time can be saved (permanently) by pressing the OFF key, or pressing ON again can start a show.** This feature (user-alterable Run-time) is enabled by setting FLAG2 in the FLAGs menu following.

This feature is intended for applications where a system is started at say 9.00am and a Run-time of 8 hours is the default to run to 5.00pm in a shop. The ON key is just pressed twice to start. While the default is set to 8 hours, on Fridays it might need to run to 9pm, so a time is manually set (but not saved) to set 12 hours. **VOLUME UP** and **VOLUME DOWN** scroll the Run-time time up or down.

The display of PIR changes as the contact opens and closes. Each opening and closure of the contact causes the hooter to beep, so a person can move around the room and hear the beep indicating the PIR was working.

**Note: If it is desired to have a timeout function so the T460R and projector are NOT left on, but no PIR input is to be used, it is necessary to short out these contacts, otherwise the "Run-time" timeout from the last key press will never timeout. Place a wire link between the screw terminal pins. Leaving the link off will cancel out any timeout function.**

## PIR/General-purpose (GP) Input system, inputs for timer or user start-switch

A PIR (Passive InfraRed) or switch sensor input is provided at J5, the 3-pin connector alongside the RS485 3-pin socket. It has a number of functions:

- A **PIR input** to restart a Run-time time-counter system integrated with the control program, so that after a preset Run-time without either a keyboard key push or a signal indicating the presence of an audience, the controller will power down the projector/screen. This timer is reset to the default Run-time whenever the PIR detects that people are present in the room,

or an operator operates the **ON/SOURCE** or **VOLUME UP** or **VOLUME DOWN** keys on the controller. Setting the timeout to "None" can disable it. (See the Set Run-time, PIR setup screen.);

- A **Keyswitch input** to the GP-Input, to unlock a locked system. The **ON** key then starts a show manually;
- A **Timer input** to the GP-Input to auto-start a system when an external electronic timer signals a system start is required by **closing** a contact. The projector/screen warms up, runs a show (maybe starting a DVD player automatically), and when an **open** is detected on this input while running, the DVD is stopped, and the projector/screen cools down and returns to the standby state;
- A **PIR** start mode (PIR to PIR input) where a show auto-starts when a momentary **open** circuit is detected on this input. The show is timed by the default time of the Run-time timer;
- A **Switch** start mode (to the GP-Input) where a show auto-starts when a momentary **closed** circuit is detected on this input. The show is timed by the default time of the Run-time timer.

## *Five ON presses:* Set Warm-up / Cool-down time

For each projector/screen family programmed into the T460 there are pre-programmed "warm-up" and "cool-down" times, which are usually set by either using a value from the user's manual or by actually measuring a projector/screen warm-up/cool-down time in the JED lab. These times may vary from unit to unit of the same model, or can vary within the family due to different lamp types or powers across the range. This setup menu item allows a new time setting at install time (or later).

```
Set Warmup
Vol Dn acts
```

If this is NOT altered, the JED pre-programmed value is used. The **OFF** key exits and saves the new value (or **0** for the default.):

```
Warmup time
uses preset
```

If a new value is needed, either to save time with a projector/screen found to be faster, or to slow it down for a slower-starting one, simply use the **VOLUME UP** key to increment the value or the **VOLUME DOWN** key to decrement it:

```
Warmup time
 120 secs
```

The **OFF** key exits and saves the new value.

Then the user can set a **Cooldown Time** in an exactly similar way, with the default used if there is nothing set here (value zero stored), up to a maximum of 240 seconds.

## *Six ON presses:* Set T461 (or IN400, if selected) channel allocations

### T461 settings: (see IN400 setting following)

**Note: It is imperative to set up the T461 channel links, if you are intend using a T461, otherwise NOTHING will happen when you try to play audio through it. While it will indicate "T461 comms OK", because the 4 audio channels in the T461 have NOT been linked to the 8 possible projector/screen channels, no selection is made (a default of T460 channel 1 … 4 defaults to T461 channels 1 … 4 for a new system).**

Moving to the T461 links screen shows:

```
T461 links
Vol Dn acts
```

Pressing **VOLUME DOWN** once shows the current T461 allocation for Video channel 1:

```
Set Ch. 1 as
no T461 used
```

Pressing **VOLUME DOWN** repeatedly scrolls through the current projector/screen channel allocation for the T461 through channels 1 ... 8, and the default for a new system is "**no T461 used"** for each channel past 4 and 1...4 for channels 1 ... 4.

To perform a channel allocation, use the **VOLUME DOWN** key to select the **"Set Ch. 1 as"** display on the top line, and then use the **VOLUME UP** key to select the desired T461 channel (1 ... 4 or "no T461 used").

```
Set Ch. 1 as
T461 Ch. 1
```

The **VOLUME DOWN** key scrolls to the next channel, and you can roll around checking and re-allocating with **VOLUME UP** as desired:

```
Set Ch. 2 as
T461 Ch. 2
```

For convenience, the T461 channels would normally be allocated in the same order as the projector/screen video channels, but projector/screen channels with no audio can be skipped, so, for example a microscope or document camera would be set to "no T461 used":

```
Set Ch. 3 as
no T461 used
```

T461 channels can also be shared, so a general purpose video camera input, which might be used for Video (say, on projector/screen channel 4) and S-Video (say projector/screen channel 6) could share one T461 audio channel, say channel 3.

```
Set Ch. 4 as
T461 Ch. 3
```

Projector/screen channel 5 might be a laptop, so we will allocate it to T461 channel 4:

```
Set Ch. 5 as
T461 Ch. 4
```

We now set projector/screen channel 6 (see above, S-Video) to share T461 channel 3:

```
Set Ch. 6 as
T461 Ch. 3
```

We finish up by deselecting the T461 on projector/screen channels 7 and 8:

```
Set Ch. 7 as
no T461 used
```

(and)

```
Set Ch. 8 as
no T461 used
```

When all 8 channel links have been set, scroll through them all once again using the **VOLUME DOWN** key to scroll through all the channels to check.

Then exit this procedure using the **OFF** key.

### *Alternate: Six ON presses:* IN400 settings, channel and volume multiplier:

**Note: It is imperative to set up the IN400 channel links, if you intend using a IN400, otherwise NOTHING will happen when you try to play audio through it. While it will indicate "IN400 OK", because the 8 audio channels in the IN400 have NOT been linked to the 8 possible projector/screen channels, no selection is made (a default of IN400 channel 1 … 8 defaults to IN400 channels 1 … 8 for a new system).**

**To reach this point, you must have selected IN400 in the third (Audio/Mute) menu.**

Moving to the T461 links screen shows:

```
IN400 links
Vol Dn acts
```

Pressing VOLUME DOWN moves to the IN400 links screen:

```
Set IN400
chan/vol.mlt
```

It then shows the current setting for channel 1:

```
T460 Ch1->
IN400Ch1:V14
```

Pressing **VOLUME DOWN** repeatedly, scrolls through the current projector/screen channel allocation for the T460 channel through 1 ... 8, and the default IN400 channel for a new system is 1 ... 8 for T460 channels 1 … 8.

To perform a IN400 channel allocation for a T460 channel, use the **VOLUME DOWN** key to select the **n** in the **"T460 Chn"** display on the top line, and then use the **VOLUME UP** key to select the desired IN400 channel (1 ... 8 or "IN400 OFF") in the

bottom line. Note that the IN400 has eight channels but functions are set across these channels, and video signals as well as audio channels are locked to IN400 channel numbers. Thus:

- IN400 channels 1 and 2 are audio channels 1 and 2 and DVD 1 and 2 (actually Composite Video on RCA);
- IN400 channels 3 and 4 are audio channels 3 and 4 and AUX 1 and 2 (actually Composite Video on RCA);
- IN400 channels 5 and 6 are audio channels 5 and 6 and AUX 3 and 4 (actually VGA Video on DB15); and
- IN400 channels 7 and 8 are audio channels 7 and 8 and PC1 and 4 (actually VGA Video on DB15);

The use the green **ON** key to scroll the volume multiplier for the IN400 (at the right-hand end of the lower line, after the **V**.)

```
T460 Ch1->
IN400Ch2:V15
```

The **VOLUME DOWN** key scrolls to the next channel, and you can roll around checking and re-allocating links and volume with the **VOLUME UP** and **ON** keys.

The Volume multiplier factor is a number from 1 to 20 which scales the top value of the audio range. So a value of 20 gives a full range of 0-100 for the IN400 volume, and each count represents a 5% change (eg a value of 18 gives an audio range of 0->90).

This function is provided because the IN400 has no manual pre-set volume control by channel, as the T461 has, so this allows a basic channel level balancing and can reduce the chance of speaker damage from the 80 watt amplifiers in the IN400. The multiplier defaults to 10.

(There is also a non-linear transfer function in volume settings driving the IN400 with breakpoints in the slope at a T460 volume setting of 5 and 10. By the count of 5, the value sent to the IN400 is 50% of full scale, and by the count of 10 the value is 75% of full scale. This is done because the audio response of the IN400 is very much compressed into the top few counts, and this non-linear transfer function spreads out the usable range.)

Use the **OFF** key to exit from this setup.

**The system then drops through to the "Remap" setup to allow setting of mapping of projector sources to T460 channels. This is covered in:** ***Nine ON presses:*** **Remap of projector channels selected by T460 channels.**

## *Seven ON presses:* Set new PIN

Moving to the PIN setup screen shows:

```
Set PIN
Vol Dn acts
```

The first instruction screens show:

```
Vol Up=Inc
Vol Dn=Enter
```

then:

```
OFF exits
```

The entry screen is:

```
PIN= 1***
Inc. ↑
```

Enter all four digits:

```
PIN= 1234
OFF sw= Save
```

After all four digits are entered, press **OFF** to return to the main setup entry screen, and save the selection. Press **VOLUME DOWN** to re-enter the PIN setup, if the number is not as desired

## *Eight ON presses:* Relay/Screen functions and projector Down/Up, dimmers, etc and setup of channel switching via T461-R8 or T462-R2/4 relays

The relay system allows the following functionality:

- The communications path set up (RS232 or RS485). RS485 is used to talk to an optional version of the T462-R4 if the RS232 is otherwise occupied for DVD player or Cyviz 3D/2D control. With the T460R-R4 option, 4 relays are on-board;
- Functions can be set by relay number;
- Relays not used by usual functions (screen, projector drop, lamp dim) can be individually re-applied to Switcher use;
- Screen down/up (Relays 1 and 2) can be normal (at On and Off times) or can be early, eg dropping screen for use with O/H projector (without starting video projector), or can precede and then flow to projector start (so screen is down before projector is bright);
- The system can:
    - Directly control Down (Relay 1) / Up (Relay 2) drives to screen motor (2 relays, via 12V to 240VAC external power relays) and stops after T460-set times;
    - Can control the motor via a Somfy ILT low voltage controller (2 relays to CD4 or "IB+" animeo or similar controller). Up or Down lines are pulsed for 2 seconds to start motion (on Relay 1 for Down and Relay 2 for Up), and motor stops after T460-set times with BOTH relays actuated together;
    - Via ScreenTechnics CONNECT card with pre-set 2-second pulses on two relays, and allow limit switches to stop motors. This works on ScreenTechnics "ElectriCinema" and similar units like their "projector dropper" and a casing dropper.

      Various other screen makers make screens with similar timing and contact input with pull-ups to a positive voltage.

      **Important note: ScreenTechnics have just changed from the Connect board to a new Chinese control board for their revised lower-cost "ViewMaster Pro" screens. The Connect board had a pull-up to a positive +5 rail, and drives well with NFETs on the T460R-R4. The new Chinese board pulls down to -11 volts, and does NOT work with FET switches to ground. The T462-R2 or –R4 uses a non-grounded (floating) common, and so works with both screen types of control boards. ViewMaster screens can be controlled via the "op/dn,cls/up" option below driving the "trigger" input;**
    - Can control the motor via a single relay (Relay 1, set to "cls/dn,op/up") closing to lower the screen and the same relay opens to raise the screen, again, using limit switches to set extent of screen travel. Normally screens that takes an input with this function uses +12v from a projector "trigger" output (12v gives "down" 0v gives "up"). An external relay, e.g. on a T462 with its common connected to +12volt supply will drive a screen correctly in this mode;
    - Can control the motor via a FET output on the T460-R4 via Relay1 in **inverted** mode, using a 1Kohm resistor to supply 12 volt power to the screen and using the FET "Relay 1 output" to short the 12 volts to ground. The drive to the FET has been inverted (select: "op/dn,cls/up" at release 3.60), so that the FET is ON when the T460R is in standby (so no volts to the screen, and the screen is Up). When the On button is pressed, the FET is turned OFF, and 12 volts is applied to the screen via the 1k resistor, and the screen goes Down. When the Off button is pressed, the FET goes ON and the volts to the screen goes to zero and the screen goes Up). This resistor links from the 12v pin of the power supply connector, across the top of the black power supply inverter, to the Relay1 pin on the top 5-pin relay connector. Run two wires, red and black, from Relay1 (red) and Gnd (black) on the T460R 5-pin connector to the trigger input on the screen;
- Screen down/up times can be set individually (up to 2 minutes), so that the screen is extended just the right amount for the installation. Screen functions can be disabled, and the first two relays used for channel switching (via the yellow keys) or to drive external switchers with normal (On key) channel selection;
- Projector descend/lift (Relay 3) can be enabled or re-allocated to switchers. In "projector descend/lift" mode, the relay ON lowers the projector and it stays lowered while the contact is kept on for the whole session, rising when the relay is OFF. It can also delay raising the projector (for cool-down time). Relay 3 can just be a 2 sec. Pulse for Projector Down;

- Relay 3 can be paired with relays 4 or 7 which can be set to “lift” for a time of up to 2 mins at end of Cooldown, called "End time pls". This is also for Down and Up motors (via 12V to 240VAC external power relays. Relay 4 or Relay 7 can lift up with a pulse at the OFF button time as well as at the end of Cooldown Time ;

- Relays 3 and 4 can be paired with the screen relays 1 and 2 in a system which also uses relays 3 and 4 to operate a linear actuator which can move a screen box out from a wall or lower it from a ceiling, and then relays 1 and 2 take the screen down and up normally.

  The sequence is:
  1. Relay 3 operates in “Pre-pulse” mode with a run time set by the user as “Pre/Pwr time” which takes the arm out;
  2. After “Pre” timeout the T460 switches on the projector and operates Relay 1 (and 2 in Somfy mode) to lower the screen. (any screen control mode can be used: Direct Rly1(timed) Somfy (Relays 1 & 2), Single pulse (ScreenTechnics and Close down/Open up);
  3. The projector then warms up (while the screen moves down) and runs normally;
  4. When the “Off” button is pressed, the screen is commanded up (using Direct/Somfy/Single/Close down/Open up);
  5. The screen moves up while the projector cools down. Make sure “cooldown time” is > screen up time;
  6. Relay 4 then operates for the time required to withdraw the arm after the screen is up, set up as "End time pls".

- Room light dimming (Relay 4) can dim lights at end of Warmup time, and restore lights at Off time. Dimming also turns off (full brightness) during Mute selection (via yellow keys or as dummy channel). Relays 4, 5 and 6 can control a C-Bus dimmer (Relay 4 is full dim, Relay 5 is half dim and Relay 6 is full house lights (no dim.) Relay 5 is for a dummy “On” channel which can be selected as a “OHP” selection half-dim. Relays control a C-Bus as simulated push button inputs;

- **Special Fluro/Incandescent switching mode via relays:** This mode is selected by setting FlagD=1.

  The idea of this special setup is control change-over between the normal room fluro lighting (turned on manually when the room is entered) and lower level-controlled incandescent lighting during projection times. Also, when Computer or Laptop (VGA) is selection on the projector, the room lights are set to a higher level than during showing a Video or S-Video program. When the Off button is pressed, the fluro lights are turned back on, and the incandescents are turned off. Different relays are used for the end-time switching. All relays must be set to “Free switcher” in the relays menu.

  This setup pulses relays 3 and 5 when the On button is pressed, and pulses relays 1 and 7 when the Off button is pressed. (Relays 3 and 1 are OFF and ON for the Fluro, and relays 5 and 7 are ON and OFF for the Incandescent lights respectively.)
  To control the brightness so computer/VGA modes are brighter than Video/S-Video, set a relay to operate by channel in the “set relays by channel” menu at the end of the other relay setups: Set “Relays do run switcher” and then select a relay to do full dim for the video and a relay to do half dim for computer, in “pulse” mode. Leave the projector channel to be the same as the channel number;

- **A variety of external video and VGA Switchers can be controlled**. These take relay contact inputs and the relays simulate manual push-buttons or static switches on the Switcher front panels. Up to eight relays can be used for Switcher functions (by disabling Screen or Projector Down/Up and room dimming relay options.) Manual push buttons are simulated with a 1 second “press” and static switches with a constant relay ON. Two or three different switchers can be mixed in a system (even re-using and sharing relays). Switcher functions are selected exactly the same as normal projector-switched channels and are “named” in the same way as projector channels. (Switcher operation is transparent to the end user.) The Switcher setup screen following allows setting of “Projector-switched” or relay->Switcher by channel selection, and for each one, setting pulse or static operation, and setting which channel command to send to the projector so it accepts the output of one (or more) Switchers. (Some channels can bypass Switchers, and pass directly to a projector, eg Video and VGA signals can each go through their own Switchers, but a S-Video channel can go directly to a projector);

- The “Set Switchers” menu can also be used in installations where a relay needs to be pulsed or static while a channel is selected (eg to start a player or switch power to a peripheral, eg a camera), and in this mode, the projector channel for that selection is set to the same as the T460 channel number;

- Relay 6 can be programmed to provide a 1 second pulse at all or some channel changes via switchers, so that switchers can be reset to a non-used channel or cleared.

- Relays 1, 3, 4 or 8 can be setup to turn ON when the On button is pressed, and turn OFF at the end of the Cooldown after a “show”. After the “Pwr.control” function is selected for a relay, the T460 prompts for a “Pre/Pwr time” delay to be set in the range 1 to 99 seconds. In use, when the ON key is pressed, the delay time is counted out with an on-screen countdown before any commands are issued to the projector, audio system or screen. This is to allow the projector (etc) to come out of

"Power Down" state and be able to accept commands. Set this time adequately to suit the power-controlled device.

(Note: if "Pwr.control" is chosen for a particular channel, it will NOT be offered for other relays which can drive this function. If another relay needs to be allocated for the "Pwr.control" function, the use of this relay must be set to something else for the presently allocated channel.)

(Switchers are made by a variety of suppliers, and we know a Quest GFX3 audio/video switcher for VGA/RGB signals, and a Quest AVX2 composite video signal switcher work fine with this. Kramer and Extron also make suitable units. Some switch audio as well, or else use the JED T461 audio attenuator for switching audio. (The T460 may also control switchers from an RS232 channel.)

**Note: If no audio features are needed, the T462-R2, T462-R4 or the T462-R4-H can be used to give a 2, 4 or 8 relay system.**

## T460R only: Select relay driver

This is only prompted if the software detects it is running in a T460R system. The T460R provides a set of four N-channel FET outputs (effectively solid-state relays) to a 5-pin Phoenix socket at the top edge of the T460R. This menu allows users to allocate relays numbered 1 …8 to be allocated to the hardware options in a flexible number of ways, ranging from no relays at all, relays only on the T460R to all relays allocated off-board to an external T462-R2 / T462-R4 or T461-R8.

The options are as follows:

**Relay driver**
**no relays** Default of no relays

(or)

**T460R only** Relays 1->4 to T460R FETs, no serial relays

(or)

**T460R+USB** USB: 439/443: Relays 1->4 to T460R FETs,
Relays 5->8 sent as 5->8

Note: If either of these first two are selected, it drops through to select options for SER2 supporting Grandview serial-controlled screen.

(or)

**T460R+T462R** Relays 1->4 to T460R FETs, Relays 5->8 sent as 1->4 serially
(This allows a standard T462R2/4 to be driven as Rel. 5->8)

(or)

**T462R2+T460R** Relays 1->2 sent to T462R2 as 1->2 (for screens like Somfy which need isolated drives), Relays 3->6 to T460R FETs,
Relays 7,8 -> 7,8 for USB

(or)

**T462R4+T460R** Relays 1->4 sent to T462R4 as 1->4, Relays 5->8 to T460R FETs

(or)

**T461R8 rlys** Relays 1->8 sent to T461R8 as 1->8

(or)

**T461R8+T460R** Relays 1->8 sent to T461R8 as 1->8 AND to T460R-R4 in parallel.

Serial 2 usage setting if not used for relays (first 2 items above):

**Set RS232/2:**
**not used** (default)

(or)

**Gndview scn.** This selects Grandview Sky-show screen and casing control.

This screen is controlled via SER/2 at 2400 baud. Commands to lower and raise the casing are sent when the On button is pressed and at the end of the Cooldown time. Commands to drop and raise the screen material itself are sent at the end of Warmup and when the Off button are pressed respectively. (If T460R relays (only) are selected, outputs from the –R4 connector on the back can still be generated for screen control (or Pre or Pwr signals) … these could be used elsewhere. If "No relays" are selected, non are!)

### First selection: Select Relay system communications mode (only if needed):

If a T461 is used and the T461 is selected in the Audio/Mute menu, the relay system also sets automatically to RS232. This is also the assumed mode for T462-R2/4 unless forced to RS485 in this menu. (RS485 would be needed if RS232/1 was used for DVD control of a Pioneer DVD player or a Cyviz 3D/2D box). This menu can pre-select RS485.

**VOLUME UP** toggles the selection and **VOLUME DOWN** exits and saves.

```
Relays via
461/2->RS232
```
(default)

(or)

```
462R->RS485
```

### Second selection: Functions for Relay 1 and Relay 2: and when they operate.

**VOLUME UP** toggles between the selections and **VOLUME DOWN** exits and saves.

```
Screen Dn/Up
with On/Off
```

This is the default selection (screen down with **ON** key, up with **OFF** key)

```
Screen Down
then proj.on
```

This is like the default selection (screen down with **ON** key, up with **OFF** key) but proj. not started until screen fully down. (The Down time must be set to control this time, even with the "cls/dn,op/up" mode, which normally has no time set.)

```
Screen Dn/Up
before proj
```

This allows the screen to come down WITHOUT the projector starting (eg to use an overhead projector.)

(After use, in this mode, the **OFF** key takes the screen up (without starting the projector), and an **ON** key starts the projector.)

```
Screen Dn/Up
bef,with dim
```

This option allows the room lights to be dimmed with the separate screen down (see previous option):

```
Relay 1/2
Switch chan
```

This option simply links the two yellow switches to Relay1 and Relay2 (typically for videoconference or simple switcher applications). (The On key functions as normal for channel changes.)

```
Relay 1/2
pwr. control
```

This option sets up Relay 1 to turn On at the press of the ON button, and OFF at the end of Cooldown. A start-up delay time is prompted for and can be set between 1 and 99 minutes.

```
Relay 1/2
Free/sw'cher
```

This option frees Relays 1 and 2 for use by Switchers. **VOLUME DOWN** exits and saves the mode.

### Third selection: Set Screen Motor Mode (and Screen Relay times, if needed):

```
Screen motor
direct drive
```

This directly controls Down/Up drives to screen motor (2 relays, via 12V to 240VAC external power mechanical or opto-isolated relays) and stops after set times. In this mode the T461/462 relays are closed when the motor is to run, and open to stop motion. **On exit, direct screen relay times are asked for, see following.**

```
Screen motor
via SomfyILT
```

This setting can control the motor via a Somfy ILT low voltage controller (2 relays to CD4 or similar controller).

Somfy appear to be the suppliers of most screen "in tube" control motors used by Herma, Draper, (older) Screen Technics and LP Morgan, (shipping 30,000/day!) See: http://www.somfy.com/au/index.cfm

Control is via "telephone" (RJ9) crimp on connector for an "ILT" named motor ("ILT" are the French initials for Electronic Limit Switch). Momentary contact closures between a DOWN line (Black) and COMMON (Yellow) start a Screen Down operation. ). Momentary (2-second) contact closures between an UP line (Red) and COMMON (Yellow) start a Screen Up operation. The motor stops when both contacts close together. Relays 1 and 2 produce the correct timing in SomfyILT mode. (Ignore and protect the unused 5 volt line.) **On exit, direct screen relay times are asked for, see following**.

```
Screen motor
single pulse
```

**ScreenTechnics** "CONNECT" control card. This selection uses a single 2-second pulse on Relay 1 to start Screen Down travel, and it stops when a limit switch indicates desired extension. A 2-second pulse on Relay 2 pulls the screen up, and it is stopped by a second limit switch**. There are no timing settings so Relay 3 set-up follows.**

```
Screen motor
cls/dn,op/up
```

**Single relay mode:** This mode controls the motor via a single relay closing (Relay 1) to lower screen and the same relay opens to raise the screen. (If 12 volts is needed to trigger operation in this mode, wire the "common" line of the relays to +12 volts.)

```
Screen motor
op/dn,cls/up
```

**Single FET mode (inverted):** This mode controls the motor via a single NFET (Relay 1) and a pull-up resistor to +12 volts. The FET is On in the T460R standby mode, and turns OFF to lower the screen. When the Off button is pressed, the FET turns ON and the screen goes up.

**There are no timing settings so Relay 3 set-up follows.**
Note: In this mode, Relay 2 is also actuated at the initial screen down and turned off at the end … this can control audio gear.

**VOLUME UP** toggles the selection and **VOLUME DOWN** exits and saves.

### Set Screen Relay times, if needed: (if not needed, this time setup is bypassed)

Time for the screen control relays in Direct and Somfy modes are adjustable in 1-second intervals to a maximum of 120 seconds.

```
Relay 1 time
Down= 25secs
```

Use the **ON/SOURCE** and the **VOLUME UP** keys to adjust the relay time in seconds, up to a maximum of 120 seconds.

After it is set, press **VOLUME DOWN**, to proceed to the Up relay time:

```
Relay 2 time
Up= 30secs
```

Use the **ON/SOURCE** and the **VOLUME UP** keys to adjust the relay time in seconds, up to a maximum of 120 seconds.

After it is set, press **VOLUME UP** to exit and save the selection.

A two-second display of the set values shows:

**Relay time**
**set: 25, 30s**

## Fourth selection: Relay 3 modes (projector drop/raise or power or screen casing)

This relay by default controls projector drop and raise, but can control casing drop and raise, using a motorised mechanism.

**Relay 3 mode**

**Proj Dn/Up** (default, lower with power on, raise with power off)

(or)

**Pr.Dn/Up dly** (as above, with proj. raising delayed till after cool-down)

(or)

**Pre Pulse** (2-second pulse to control actuator or screen box lowering. A start-up delay time is prompted for and can be set between 1 and 99 seconds. This can allow a casing to operate for a programmed time until the screen comes down and the projector turns on.) **This needs relay 4 or 7 set for pulse to raise projector or casing at OFF or END. )

(or)

**Pr.Dn Pulse** (For Somfy motors, 1 sec. pulse drops proj. down only at On time. **This needs relay 4 or 7 set for pulse to raise at OFF or END)

(or)

**Pwr. control** (uses Relay3 for power control, ON at start, OFF at end. A start-up delay time is prompted for and can be set between 1 and 99 seconds.)

(or)

**Free/sw'cher** (This option frees Relays 3 for use by Switchers.)

**VOLUME DOWN** exits and saves Relay 3 mode.

**This MUST be paired with Relay 4 or Relay 7, which provides a timed contact closure (on 4 or 7) at the STOP time or at the very end of the cool-down period, and which can be used to raise a Somfy direct projector or casing motor-driven drop/raise mechanism. (Select "Off time pls" or "End time pls" in Relay 4 or relay 7 screens.)

## Fifth selection: Relay 4 modes (room lights dim, end time pulse)

By default this relay controls room light dimming.

Relay On dims room lights, and default turn-on is after warm-up.

Relay Off returns room lights to full.

**Relay 4 mode**
**Dim On/Off** (default, Room lights dim when Relay 4 closed)

(or)

**CBUS on 4..6** (use Relays 4/5/6 for C-Bus light dimming)

(or)

**Off time pls** (Relay 4 used to raise projector with pulse when OFF pressed)

(or)

**End time pls** (Relay 4 used to raise projector with pulse after cool-down, or can be used to raise casing after screen is up. Use "cooldown" time setting to set the delay between screen up and casing actuation.)

(or)

**Pwr. control** (Relay 4 used for power control, ON at start, OFF at end. A start-up delay time is prompted for and can be set between 1 and 99 minutes.)

(or)

**Free/sw'cher**

This last option frees Relays 4 for use by Switchers. **VOLUME DOWN** exits and saves Relay 4 mode.

The **C-Bus system,** from Clipsal, is an Australian control system for house, school, or commercial lighting, which has simple control by users with push buttons or remote IR controllers. In this case, we interface to the C-Bus system via a Clipsal dimmer control module which takes contact closure inputs (of 2 seconds duration) into a number of inputs to ramp the room lights up or down to preset points of dimming (from full on to half or lower levels). Three relays are used for this, numbers 4, 5 and 6. (**Dynalite** make a similar dimmer system.) The half-dim option can be selected by allocating "Overhead Prj" for a channel. Selecting it selects half-dim by pulsing Relay 5. Moving to a valid projector channel restores full dim. Moving to a mute simulated channel (allocated to "Pic/Snd Mute") restored full brightness when selected and full dim when On pressed.

If **Off time pulse** or **End time pulse** is selected, on **VOLUME DOWN:**

**End time**
**Pls= 2secs**

Use the **ON/SOURCE** and the **VOLUME UP** keys to adjust the relay time in seconds, up to a maximum of 120 seconds.

**VOLUME DOWN** exits and saves End pulse time.

(Relay 5 has no special function, except as the half/dim option in C-BUS)

## Sixth selection: Relay 6 modes (pulse to switchers)

Relay 6 can be programmed to provide a 1 second pulse at all or some channel changes via switchers, so that switchers can be reset to a non-used channel or cleared. It can be selected (by default) to general switcher use, or to generate this pulse before a 1 second channel switcher pulse, before a static switcher relay setting, or BOTH.

**Relay 6 mode**
**Free/sw'cher** (Default, allows use by switcher as channel select)

(or)

**Pls.chg.pls** (Pulses Relay 6 ONLY before pulse selected channels)

(or)

**Swch.chg.pls** (Pulses Relay 6 ONLY before static selected channels)

(or)

**Both.chg.pls** (Pulses Relay 6 before ALL switcher channels)

**VOLUME DOWN** exits and saves Relay 6 mode.

## Seventh selection: Relay 7 modes (pulse to switchers)

Relay 7 can be used for general Switcher duty, or used to generate an End Time Pulse (Alt. To relay 4).

**Relay 7 mode**
**Free/sw'cher** (default)

(or)

**Off time pls**

(or)

**End time pls**

If **Off time pulse** or **End time pulse** is selected, on **VOLUME DOWN:**

**End time**
**Pls= 2secs**

Use the **ON/SOURCE** and the **VOLUME UP** keys to adjust the relay time in seconds, up to a maximum of 120 seconds.

**VOLUME DOWN** exits and saves End pulse time.

## Eighth selection: Relay 8 modes (pulse to switchers)

Relay 7 can be used for general Switcher duty, or used to generate an End Time Pulse (Alt. To relay 4).

```
Relay 8 mode
Free/sw'cher
```
(default)

(or)

```
Pwr. control
```
(Relay 8 used for power control, ON at start, OFF at end. A start-up delay time is prompted for and can be set between 1 and 99 minutes.)

**VOLUME DOWN** exits and saves End pulse time.

## Ninth selection: Enable Switcher modes for relay system

This disables/enables Switcher functions:

```
Relays don't
run switcher
```

(or)

```
Relays do
run switcher
```

**VOLUME UP** toggles the selection and **VOLUME DOWN** exits. If "don't" is selected, this exits to the start of main menu.

## Tenth selection: Select Relay to Switcher links, modes and target channels for projector

If "do" is selected, the next menu is Switcher setup:

```
Set relay fn
by channel
```

then the screen showing a selected channel and its options and links is shown, and **VOLUME DOWN** rolls through all eight channels:

```
Set Ch. 2 as
Proj. Switch
```

This is the default for a channel, where the projector/screen does the video channel selection.

If a relay is to be used via a Switcher, pressing **VOLUME UP** moves the relay selection through all available relays ("Rly5" is shown in the example following, but it can run through all 8 relays, and Proj Switch), and for each gives the choice of a 1-second pulse ("1sec") or a static ("swch") mode.

```
Rly5:1sec->2
```

(or)

```
Rly5:swch->2
```

Also in this example, pressing **ON/SOURCE** rolls the channel for the Switcher output selected in the projector/screen for that channel. It rolls through all eight projector/screen input selections. Use the tables provided for projectors/screens in the latter half of this manual to choose a channel for the projector/screen in use, eg Hitachi use Channel 1 as a VGA input, so a VGA switcher might use channels T460 channels 5, 6 and 7 via a VGA switcher and a "->1" directs the projector/screen to switch to it's channel "1" to accept the switcher VGA output. (Relays 6, 7 and 8 might drive the switcher

**Pressing OFF saves the selected option. Go to the "remap section if required:** ***Nine ON presses:*** **`Remap of projector channels selected by T460 channels`**

The **C-Bus system,** from Clipsal, is an Australian control system for house, school, or commercial lighting, which has simple control by users with push buttons or remote IR controllers. In this case, we interface to the C-Bus system via a Clipsal dimmer control module which takes contact closure inputs (of 2 seconds duration) into a number of inputs to ramp the room lights up or

down to preset points of dimming (from full on to half or lower levels). Three relays are used for this, numbers 4, 5 and 6. (**Dynalite** make a similar dimmer system.)

**Relay 4** is actuated for two seconds as the projector/screen starts running a show, to set **dimmed** mode,

**Relay 5** is actuated for two seconds if the intermediate lighting level is set (by selecting "Overhead Prj" as a source), muting the projector/screen sound and video, but setting house lights to an alternate level.

**Relay 6** is actuated for two seconds to return room lights to full brightness, and is pulsed at the end of a show, or when the source is set to "Pic/sound mute".

(With C-Bus enabled, **Relay 1** and **Relay 2** are still used for screen lowering and raising. **Relay 3** still operates as before, turning ON when the ON key is pressed and OFF when the OFF key is pressed. This is used for operation of door, mirrors or scissor jacks to lower a projector from a ceiling.)

The **Quest** (made in Australia) system uses a GFX3 audio/video switcher for three RGB signals, and a Quest AVX2 composite video signal switcher between two composite video channels. The relays operate as follows:

**Relays 3, 4, and 5** switch ON for 1 second and then OFF, to select between three RGB (computer D15 analog) signals. The RGB output of the GFX3 feeds RGB1 analog input on the projector/screen.

Audio follows the switching of RGB video, and the audio output of the GFX3 feeds a T461 audio in, where audio level control takes place. Set the T461 links for the same T461 channel for the three RGB channels.

**Relay 6** pulses ON and OFF to disable the RGB channels when Video modes are selected.

**Relays 7 and 8** select between two Composite Video Channels switched by an AVX2 Mk II. Relays stay ON as the channel is used, and go OFF when switched to RGB. Audio can be switched in the T461 via two channels.

**Relays 1 and 2** are still used for screen lowering and raising.

## *Nine ON presses:* Remap of projector channels selected by T460 channels

This menu is used after setting up an IN400 audio mixer/switcher, the relays setup for external video switchers, or for any other reason where projector source channels need to be moved around in the T460 1 … 8 channel space.

This might be used with switchers, eg one which selects between two Composite Video inputs, programmed via relays, an IN400, or a Kramer switcher as T460 channels 1 and 2, but the projector is told to go to its Channel 3 composite input for both T460 channels 1 and 2. Or one could use the 4 VGA inputs on an IN400 or via relays programmed as T460 channels 5, 6, 7 and 8 to use a projector programmed to its Channel 1, the usual VGA Computer-1 input for all four channels 5, 6, 7 and 8.

On entry:

```
Don't remap   (default)
T460->prj/ch
```

(or)

```
Do remap
T460->prj/ch
```

The **Volume** Up key toggles between the two selections.

If `Don't remap` is selected and **Volume Down** or **Off** pressed, the setting option exists with no change.

If `Do remap` is selected and **Volume Down** or **Off** pressed, the setting option proceeds with the message:

```
Map proj. Ch
to T460 Ch.
```

then

```
T460 Ch. 1->
Proj.src: 1
```

The **Volume Down** button then rolls the T460 from channel 1 …8 (top line), and the **Volume Up** button rolls the actual channel message sent to the projector to select a projector source (lower line), also from 1 … 8. The **OFF** button exits.

## *Ten ON presses:* Edit user-alterable names for channels or special functions on yellow keys (also for non-English names for channels)

This menu allows up to four names for channels to be altered for special purposes. These four names in the list selected with the "Set Channels" menu are located after "Viewer" in the alphabetically ordered list. They default to: **User name 1** through **User name 4.** They are placed on the lower LCD line when sending user-entered strings from EEPROM 100h … 13Fh. (See Edit EEPROM setup screen (later).

Moving to the Names setup screen shows:

```
Set names
Vol Dn acts
```

Pressing **VOLUME DOWN** enters the edit mode, pointing to the first editable name:

```
Edit Name 1:
User name 1
```

Pressing **VOLUME UP** scrolls through the four names.

Pressing **VOLUME DOWN** enters edit mode for the selected name (with a couple of instruction screens):

```
User name 1
↑     'U'=55
```

(This shows the first character in the name being setup for editing (the ^), and in the lower line, the character in quotes with its ASCII code in HEX.)

Pressing **ON** scrolls the **most** significant hex digit of the code from 20h (a "space" to "/"), 30h up (numbers, then : ; < = > to "?"), 40h to 5Fh ( Capital letters, then [ \ ^ _), 60h to 5Fh (lower case letters, then { | } ~ ), then some specials from 80h to 8Fh (a, o, u, A, O, U all with Umlauts, i.e. ä ö ü Ä Ö Ü )

Pressing **VOLUME UP** scrolls through the least significant digit of the ASCII hex code.

Both incrementing buttons roll over and start again.

Pressing **VOLUME DOWN** moves the arrow (the character being edited) to the right through all 12 cells, and then exits to the initial screen above, which shows the completed edit. At this point, **VOLUME UP** goes to the next name to edit, and **OFF** exits the name editing procedure.

The new names can be now used in the "Set Channels" menu for any channel. They are after "Viewer" in the list.

## *Eleven ON presses:* Set Security and Timer auto-start options

The security and auto-start menu setup allows for Keyswitch unlock, PIN number unlock, Timer auto-start, PIR input auto-start and customer push-button switch auto-start. All are grouped under this setup menu item:

```
Sec./Timer
Vol Dn acts
```

Pressing **VOLUME DOWN** gives:

```
Set Security
(OFF saves)
```

and then shows the current state of the security/start control system:

**Option 0:**

```
No security
features set
```

if nothing is set from these selections. (The PIR/Input is then used to reset the Run-time timer as described above.)

**Option 1:** Pressing **VOLUME UP** scrolls through the sub-menu:

```
Keyswitch
allows start
```

This option allows a Keyswitch contact **closure** into the General-Purpose Input to unlock the system. Pressing the **OFF** key saves this option and shows the current "Unlock time", for example:

```
Unlock time
 1h 20min
```

Pressing **VOLUME UP** and **VOLUME DOWN** scroll the Run-time time up/down through values from 1 Min to 16 hours, 0 Min. OFF saves this time setting. The Unlock time is the time after a Keyswitch or PIN number has been entered for the user to actually start the show. (see later for how this all works)

**Option 2:** The next menu item is:

```
Keyswitch sw
pwron T461/8
```

This operates similarly to the previous Keyswitch option, but switches on power via relay 8 on the T461, to, for example, power up an equipment rack.

There is then a similar prompt for unlock time as above. **OFF** exits.

**Option 1, 2 startup:** When the T460 starts after one of these two security options is selected and saved, along with the "unlock" time, the system pauses waiting for the start condition to be detected:

```
Waiting for
key to start
```

At this point, operating the Keyswitch gives a startup message:

```
Key ON
Powering up
```

This is followed by the normal startup sequence, showing projector/screen type and response, T461 connection, and then shows:

```
ON starts
OFF re-locks
```

OFF will re-lock and ON will start a show, maybe several hours later. (Don't forget that setting FLAG2 allows the user to setup a Run-time at this point.)

The time in this state is the "unlock" time set above. When it expires, the state goes back to the lock state shown as: "waiting for key to start".

After the show, the system returns to the locked state.

**Option 3:** The next menu item is:

```
Unlock PIN
allows start
```

Pushing OFF saves this selection.

The user is prompted for a PIN number to unlock the system, and shows the current PIN setting:

```
UL/PIN= 1234
OFF sw= Save
```

Pressing **OFF** saves this, or **VOLUME UP** and **VOLUME DOWN** enters the standard PIN number entry screen:

```
PIN= 1***
Inc. ↑
```

After entry, the value is shown as above. Pressing **OFF** saves.

There is then a similar prompt for unlock time as above. **OFF** exits.

**Option 3 startup:** When the T460 starts with the PIN option, the system pauses, waiting for the start condition:

```
ON to start
with PIN
```

Push ON and after entering a valid pin:

```
Valid PIN
for unlock
```

Then follows the normal startup sequence, showing projector/screen type and response, T461 connection, and it then shows:

```
ON starts
OFF re-locks
```

**OFF** will re-lock and **ON/SOURCE** will start a show, maybe several hours later. (Don't forget that setting FLAG2 allows the user to setup a Run-time at this point.)

The time in this state is the "unlock" time set above. When it expires, the state goes back to the lock state shown as: "waiting for key to start".

After the show, the system returns to the locked state.

**Option 4:** The next security/start option is the external Timer into the General-Purpose Input connector. A contact on the timer **closes** to start a show and **opens** to end a show. The item to select it is:

```
Timer starts
and stops
```

The OFF key saves this setting and exits.

**Option 4 auto-startup:** When the timer contact is closed, the message:

```
Timer ON
Powering up
```

is shown. The system goes straight into warmup and runs the show. Consider using the source **"DVD: Control"** to control the source of the show. The show ends when the timer contact opens.

**Option 5:** The next option uses a PIR input into the PIR/Input pin. This is a normally closed contact, which **opens** when a person is detected in the vicinity:

```
PIR starts
Runtime stps
```

This option uses the Run-timer to time the length of the show.

**Option 6:** The next option uses user-operated switch input into the General-Purpose Input pin. This is a normally open contact, which **closes** to start a cycle:

```
Switch start
Runtime stps
```

This option uses the Run-timer to time the length of the show.

**Option 7:** The next option uses user-operated swipe card reader contact closure output into the General-Purpose Input pin. This is a normally open contact, which **closes** to start a cycle:

```
Swipe start
Runtime stps
```

This option uses the Run-timer to time the length of the show.

**Note: Option 5, 6, 7 auto-startup/swipe startup:** When the PIR opening or switch/Card reader closure is detected, the system shows the message:

```
Switch On
Powering up
```

The system goes straight into warm-up and runs the show. Consider using the source **"DVD: Control"** to control the source of the show. The show ends when the Run-time timer finishes (or the OFF button press).

**Option 8:** The next option sets a Projector PIN number TO BE SENT TO THE PROJECTOR: This is only implemented on some Mitsubishi projectors at this time. **This does NOT set a security mode (it reverts to "No security")** If "swipe start" is needed, this must be selected AFTER the projector PIN is set. The 4-digit PIN is sent after warm-up as: "00PASS1234".

```
Set PIN for
proj.disp.on
```

### *Twelve ON presses:* Set Flags

A series of flags have been provided enable users to control special options scattered thought the drivers for various projectors/screens. Eight flags (numbered 8 to 1) can be set to a 0 (Off) or a 1 (On) by this menu item. An additional set of flags called FLAGA to FLAGH are accessed after setting the first 8.

Uses of these flags are covered in the manufacture and model-specific parts of this manual. These notes will indicate the application of the flag and what each state means. Once the flags are set or reset in this menu they are saved in non-volatile memory and used by these drivers for the designated functions.

The initial screen shows:

```
Set Flags
Vol Dn acts
```

Pressing **VOLUME DOWN** enters the flag setup:

```
Check/set
spec. flags
```

The display and alteration screen is then shown:

```
ON  10001011
Flg:8765432↑
```

which shows flag 1 of the flags is a "1", or ON.

Pushing the **VOLUME UP** key toggles this flag from 0 -> 1 or from 1 -> 0, and the text word changes from ON to OFF to ON:

```
OFF 10001010
Flg:8765432↑
```

Pressing **VOLUME DOWN** moves to the next flag, as shown by the up arrow "^". The ident word changes too:

```
ON  10001010
Flg:876543↑1
```

Repeatedly pressing **VOLUME DOWN** scrolls left through all 8 flags and back to flag 1.

Pressing the **OFF** key will allow setting the FLAGA to FLAGH group.

Pressing the **OFF** key again will allow setting of the FLAHI to FLAGP group.

Pressing **OFF** again then exits the alpha flag setting, and saves all the flags for use by drivers.

Note: different drivers may use the same flag for different purposes. Be sure to look at projector/screen specific uses.

Flag allocations currently used:

**FLAG1 =1** Enables special functions (baud rate change, etc) (Auto-adjust/Auto Sync, etc moved to FLAGG).

**FLAG2 =1** Enables user changing of Run-time of projector/screen after pressing ON button.

**FLAG3 =1** Enables alternate A/V Mute ON/OFF keyboard prompts (rather than Volume Up/Dn key labels). Also used to blank lower line of LCD (in volume mode) and stop volume messages to projector/screen, if no audio used.

**FLAG5 =1** Enables toggle mode for user-defined yellow key codes;

**FLAG6 =1** Enables Inter-T460 communications. Allows two T460s to be cross-linked in a hot backup mode, so starting unit gets channel info from adjacent Off or Cooling-down unit.

**FLAG7 =1** Sets baud Rate for Plus U5, Everest and BenQ MP620 and MP720p to 38400 instead of presets for projectors which need to use 460b baud rate converter.

**FLAG8 =1** Enables sending/receiving from remote T460 in dual T460 systems. See section at end of this manual.

**FLAGA=1** Enables use of high EEPROM locations to drive Kramer, Extron or DPA-22 switcher.

**FLAGB=1** Enables use of additional (different from main display) device controlled via the second RS232 port.

**FLAGC=1** Enables audio to be controlled by Kramer/Extron/DPA-22 switcher rather than via main display.

**FLAGD=1** Enables special relay mode for Fluro Off/Incandescent On at ON, then Fluro On/Incan. off at OFF (See relays).

**FLAGE=1** Enables Ethernet connectivity via the T464 device.

**FLAGF=1** Enables internal testing.

**FLAGG=1** Enables auto-adjust/Auto sync (or whatever it is called) for Eiki/Philips/Sanyo, InFocus, Mitsubishi, Sharp, Sony.

**FLAGH=1** Enables T460 LCD backlight off at all times. (use with older LCD if backlight too bright for installed location.

**FLAGI=1** Enables Hardware triggered MUTE via relay input to PIR connector (e.g. for Fire alarm program triggered MUTE. Switch OPEN mutes system, Switch CLOSED allows normal operation.)

**FLAGJ=1** Select alternate sources for multiple devices. Details in PartB manual under drivers

**FLAGK=1** Select alternate sources for multiple devices. Details in PartB manual under drivers

**FLAGK=1** Send EEPROM channel data 2 sec after source send

**FLAGM=1** Enables microphone operations in standby mode via a T461 channel 4. Needs a dummy channel selected to "**Mic.Vol.Set**" in menu 2 and "**T461 runs aux. audio**" in the third menu (See Page 5 for use. )

**FLAGN=1** Moves channel allocation for "Auxiliary audio" in a T461 (channel 4) to channel 3 to suit a T441 based system.

**FLAGO=1** Send EEPROM channel data IN PLACE OF source send

**FLAGP=1** To use mute toggle for DELL 2400MP and 5100MP

**FLAGQ = 1** Show On:sound instead of On Screen

**FLAGR = 1** Force 9600 baud (Panasonic)

**FLAGS = 1** Force 19200 baud (Panasonic)

**FLAGT = 1** Force backlight on always for white on black LCD

(Flags U, V, W and X not used currently.)

**NOTE: Separate notes covering Kramer/Extron and additional displays is available from JED.**

## *Thirteen ON presses:* Set Auto-repeat times for Volume setting keys

This menu allows users to set the initial pause times and the time between repeats for the audio volume increment and decrement keys. (The "pause" time is the time before a repeat is actioned, and the "repeat" time is the time between repeats.)

If this is NOT altered, the JED pre-programmed value of 1 second is used. The times are set in 1/10 second increments.

```
Pause 1/10 s
uses preset
```

If a new value is needed, simply use the **VOLUME UP** key to increment the value or the **VOLUME DOWN** key to decrement it:

```
Pause 1/10 s
 20 1/10 s
```

sets a "pause" time of 2 seconds.

The **OFF** key exits and saves the new value.

Then the user can set a **Rep rate** in an exactly similar way, with the default (1/2 second) used if there is nothing set here (value zero stored), up to a maximum of 10 seconds.

The **OFF** key exits and saves the new values.

## *Fourteen ON presses:* Set audio to video channel links by channel

This menu is used on certain Hitachi projectors to select which audio channel is used for each of the video channels. ( With Hitachi, src=0 is off, src=5 is MIU).

(The "Set aspect ratio by channel" menu has been deleted in favour of this "audio to video channel link" entry menu. Setting aspect ratios can be done on projectors or flat panels which support these commands by setting dummy channel aspect ratio setting names. Generally, projectors seem to remember what aspect ratio has been selected for a channel and return to that ratio automatically.)

Moving to the audio links screen shows:

```
Audio links
Vol Dn acts
```

Pressing **VOLUME DOWN** once shows the current audio allocation for Video channel 1:

```
Set audio ch
by proj. ch.
```

Pressing **VOLUME DOWN** repeatedly scrolls through the current projector/flat panel channel allocation with the audio allocation for channels 1 through 8.

To perform a channel allocation, use the **VOLUME DOWN** key to select the **"Set Ch. 1"** display on the top line, and then use the **VOLUME UP** key to select the desired audio channel (0 ... 5) "**Audio src= 0**" is audio OFF for that channel. "**Audio src= 5**" is currently only used on the Hitachi "MIU" interface. (The number of audio channels varies between models.)

```
Set Ch. 1
Audio src= 1
```

The **VOLUME DOWN** key scrolls to the next channel and you can roll around checking and re-allocating with **VOLUME UP** as desired:

```
Set Ch. 2
Audio src= 2
```

Video channels can be skipped with no audio, so, for example a microscope or document camera would be set to "**Audio src= 0**", i.e. audio not used. Audio channels can also be shared, so a DVD and a VCR combo unit might use S-Video and Component video channels, and share one audio channel. Exit this procedure using the **OFF** key

## *Fifteen ON presses:* Set LCD contrast (no meaning in T460R with O-LED display)

Moving to the bias setup screen shows:

```
Set LCD cont
Vol Dn acts
```

Pressing **VOLUME DOWN** enters the LCD setup showing current value:

```
Set LCD: 50
Vol Up/Dn
```

Use the **VOLUME DOWN** and the **VOLUME UP** keys to adjust the bias/contrast control for optimum viewing angle for the usual operator viewing position. Like most LCD screens there is some variation with viewing angle so set this carefully.

After it is set, press **OFF** to return to the main setup entry screen, and save the selection.

## *Sixteen ON presses:* EEPROM Read

This screen is for checking purposes and allows reading of the non-volatile internal memory used for storage of parameters set up in the above menus.

```
EEPROM Read
Vol Dn acts
```

Pressing **VOLUME DOWN** shows the internal status, and then the first four locations:

```
EE:000 00 32
EE:002 82 00
```

**VOLUME UP** and **On Source** move up and down the memory showing four locations (in hex) each time. **OFF** exits.

## *Seventeen ON presses:* EEPROM Edit

### Strings for additional commands to display device, or to DVD, Kramer/Extron/display control strings

(This DVD/Kramer etc. control is via SER1, and can also setup user strings to main projector from yellow keys)

**Note: EEPROM setup can also be done via SER0 and a serial command set … see end of this block for details.**

This screen allows user to view and edit EEPROM locations associated with the DVD control.

```
EEPROM Edit
Vol Dn acts
(then)
Start EE:040
```

At this point, use **Volume Up** key to increment address by 10h each press.

When at start of intended group, press **Volume Down** for instructions:

```
OFF exits
VolDn inc AD  (for 2 seconds)
(then)
ON inc HI
VolUp inc LO  (for 2 seconds)
```

After prompts for how to edit data, the following screen shows the first edit-able location 4Fh.

```
EE:04Fh= 0Ch
ASCII=
```

**VOLUME DOWN** increments the displayed address, and saves any changed data. **ON** increments the most significant nibble and **VOLUME UP** increments the least significant nibble. **OFF** exits from EEPROM Edit mode.

The display of ASCII codes (codes under 080h) gives the text equivalent of the data bytes:

Control codes are from 00h (NUL), 0Ah (LF), 0Dh (CR), to 1Fh.
Punctuation marks are from 20h ( ) to 2Fh (/), 3Ah (:) to 40h (@), 5Bh ([) to 60h (`) and 7Bh ({) to 7Fh .
Numbers are from 30h (0) to 39h (9).
Upper case text is from 41h (A) to 5Ah (Z).
Lower case text is from 61h (a) to 7Ah (z).

**Location 4Fh:** Baud rate parameter for SER1 communications:

| BAUD rate | Parameter for location 4Fh | BAUD rate | Parameter for location 4Fh |
|---|---|---|---|
| 300 | 5 | 4800 | 0Ch |
| 600 | 6 | 9600 | 0Eh |
| 1200 | 8 | 19200 | 10h |
| 2400 | 0Ah | 38400 | 12h |

"**Standard Message" structure:** The structure of user defined messages has as its first byte of the string, length, followed by the bytes of data. A CR (code 0Dh) can end the string (but this must be included in string length count).

## DVD player control code setting

**Locations 50h … 5Fh: DVD Play string:** 03h, 50h, 4Ch, 0Dh, i.e. Length = 3, "P", "L", CR.
**Locations 60h … 6Fh: DVD Reject string:** 03h, 52h, 4Ah, 0Dh, i.e. Length = 3, "R", "J", CR.

## Switcher and Aux display device setup and control (See separate document from JED)

**Locations 70h … 7Fh:** Power ON command string (single) to Kramer/Extron switcher/aux display via Ser1 (sent at ON button push, so switcher/aux display can warm up) Enabled by **FLAGA/FLAGB=1**.

**Locations E1h ... E8h:** Send channel for switcher (relays or Kramer/Extron) for channel to be ACTUALLY sent to projector, by channel. This is sent so projector/panel switches to appropriate channel to receive switcher output signal (or direct inputs). This allows switcher sent signals mixed with direct.

**Locations F0h …FFh:** Stop/end/ Power OFF message at end time for Kramer/aux display. Enabled by **FLAGA/FLAGB=1**.

## User-set commands from two yellow keys

The following four strings are for user-defined strings to be sent to projector/panel (via SER0) (and user-named LCD labels on lower line) by pressing yellow keys. (Example: "Zoom in" on left yellow key, "Zoom out" on right yellow key.)

**FLAG5=0** mode: Auto-repeat of strings is provided for individual yellow keys.
If both yellow keys are pressed together, sends a third string from 110h (if 110h is non-zero). (Example: Send "Autofocus".)

**FLAG5=1** mode: Enables toggle mode. (No two-yellow-key mode if toggle selected. Can mix a toggle key and a non-toggle key, by setting either 110h or 130h to 00h (i.e zero-length or invalid string). (Example: Toggle aspect 16:9/4:3 or Eco/Normal.)

**Locations 100h …10Fh:** Vol up (left yellow key) press or 1st toggle, ("User name 1" put to lower line as this string is sent.)
**Locations 110h …11Fh:** Vol up 2nd toggle, or 2-key mode user send string. ("User name 2" put to lower line.)

**Locations 120h …12Fh:** Vol down (right yellow key) key press or 1st toggle. ("User name 3" put to lower line.)
**Locations 130h …13Fh:** Vol down 2nd toggle. ("User name 4" put to lower line.)

User names 1 … 4 are set with the "Set Names" setup screen, and appear for 5 seconds after string sending ends.

## Channel-specific and configure/control commands sent to switcher/aux display via SER1

Enabled by **FLAGA=1 or FLAGB=1**.

**Locations 140h … 14Fh:** Channel 1 Ser1 code to Kramer/Extron/DPA-22 switcher or aux display.
**Locations 150h … 15Fh:** Channel 2 Ser1 code to Kramer/Extron/DPA-22 switcher or aux display.
**Locations 160h … 16Fh:** Channel 3 Ser1 code to Kramer/Extron/DPA-22 switcher or aux display.
**Locations 170h … 17Fh:** Channel 4 Ser1 code to Kramer/Extron/DPA-22 switcher or aux display.
**Locations 180h … 18Fh:** Channel 5 Ser1 code to Kramer/Extron/DPA-22 switcher or aux display.
**Locations 190h … 19Fh:** Channel 6 Ser1 code to Kramer/Extron/DPA-22 switcher or aux display.
**Locations 1A0h … 1AFh:** Channel 7 Ser1 code to Kramer/Extron/DPA-22 switcher or aux display.
**Locations 1B0h … 1BFh:** Channel 8 Ser1 code to Kramer/Extron/DPA-22 switcher or aux display.

**Locations 1C0h … 1DFh**: Configure command(s) to switcher/aux display via SER1 (sent at end of warmup, can go to 1DFh with queued commands to Kramer/Extron or aux display.)

**FLAGB=1** sends picture mute (blank) commands to aux display via SER1 in step with mute to projector/panel (via SER0).

**Locations 1E0h … 1EFh:** Picture Mute ON command to aux display via Ser1.
**Locations 1F0h … 1FFh:** Picture Mute OFF command to aux display via Ser1.

**FLAGC=1** sends volume control/sound mute commands to Kramer/Extron (via SER1) rather than projector/panel (via SER0).

**Locations 1E0h … 1EFh:** Sound mute ON command to Kramer/DPA-22 via Ser1.
**Locations 1F0h … 1FFh:** Sound mute OFF command to Kramer/DPA-22 via Ser1.

**Locations 0CCh … 0CEh:** Switcher volume flags.

If **0CCh = 00h**, volume strings are increment/decrement, from D0h & D8h respectively.
**0CDh** = Volume multiplier (i.e. how many times Inc/Dec commands are sent for each volume key press.)

If **0CCh > 80h**, volume strings are absolute.
If **0CCh = 80h** it sends lead-in string from 0D0h with one, two or three digits of decimal volume. If negative, due to offset (set at 0CFh below), a minus sign may precede the digits. This numeric data is left-justified, and if a space is needed between the lead-in and the numeric data (or sign), this should be actually included in the lead-in string (at 0D0h). **82h** sends a lead-in string from 0D0h, TWO digits of volume and then terminate string from 0D0h, stored immediately after lead-in string. **83h** sends lead-in, THREE digits, and terminate string. (Binary absolute volume setting strings have not been implemented as yet).

**0CDh** = Volume Multiplier. e.g. if set to 04h, the T460 volume goes 0->25 but sends 0->100. (Settings send -80 … 20);

**0CEh =** Volume Max, e.g. set to 19h (25 dec) for a maximum displayed volume of 25;

**0CFh =** Volume Offset e.g. setting to -80 dec (B0h) will subtract 80 from the sent volume:

**Locations 0D0h … 0DFh:** Absolute volume strings for Kramer/DPA-22, (lead-in string, then terminate string. Both the lead-in string and the terminate string need a length attribute as the first byte, e.g. if a <CR> is needed, send <01><0D>)
or
**Locations 0D0h … 0D7h:** Increment volume string to Kramer, etc.
**Locations 0D8h … 0DFh:** Decrement volume string to Kramer, etc

As an example of using the EEPROM editing functions, here is how to setup the T460R non-volatile memory to drive a DPA-22 audio switcher/amplifier from the second serial port, shown step by step:

1. Set FLAGA -> 1 to enable RS232 driven switching via SER2;
2. Set FLAGC -> 1 to enable the switcher to process audio commands;
3. Set EEPROM location 4Fh -> 0Eh to set the baud rate of the second port to 9600 baud;
4. Set EEPROM location 0CCh -> 082h. This sets absolute volume commands with 2 digits of volume (DPA-22 command format is "7nn%" where nn is volume from 00 -> 60 decimal; e.g. "760%" is full;
5. Set EEPROM location 0CDh -> 03h. This sets volume increment to 3, so 0-20 on T460 sends 0-60;
6. Set EEPROM location 0CEh -> 14h (20 dec) as T460 volume displayed range 0-20, 0CFh->0;
7. Set EEPROM string locations 0D0h->0DFh to "01h 37h 01h 25h" This is lead-in of 1 byte of ASCII "7", and a terminate byte immediately following the volume digits sent of 1 byte of ASCII "%" (Values after these four bytes are ignored);
8. Choose which DPA-22 channels to allocate audio switching for. If we want T460R Ch1 to be Line 1 and Ch2 to be Line 2, then set up strings to select these at 140h and 150h, the string locations for Ch1/2:
9. So set into 140h: "04h 31h 41h 31h 2Eh" This sends 4 bytes of ASCII "1A1." for Ch 1;
10. And set into 150h: "04h 32h 41h31h 2Eh" This sends 4 bytes of ASCII "2A1." For Ch 2.
11. Set 1E0h up to "04h 30h 41h 30h 2Eh" This sends to Mute On message of "0A0."
12. Set 1F0h up to "04h 30h 41h 31h 2Eh" This sends Mute Off message of "0A1."

## Channel-specific and configure/control commands sent to Display device via SER0

Enabled by **FLAGL=1 or FLAGO=1**.

**FLAGL enabled function:** This flag allows an extra command to be "piggybacked" onto any channel message (after a 2 second delay). The commands to be sent are placed in the EEPROM memory either from the Setup menu "EEPROM Edit" function or via the Serial Edit functions described following.

The string format is the same as the SER1 commands, i.e. the first byte is a byte count and the next 15 bytes are the strings. Command storage is by channel, using addresses **140H** to **1BH** for channels 1 -> 8.

(Strings are only sent if the first byte (the length byte) is non-zero. A zero length byte just sends the normal single source command.)

Uses for this function are to apply special properties to channels, eg **Edge Blend ON** for one HDMI channel, and **Edge Blend OFF** for another channel. Also this can be used to switch a channel to **3D** for one channel and **2D** for others.

**FLAGO enabled function** (letter O not number 0 (zero): This flag allows a different command from the EEPROM to be send **instead** of the normal source command. The commands to be sent are placed in the EEPROM memory either from the Setup menu "EEPROM Edit" function or via the Serial Edit functions described following.

The string format is the same as the SER1 commands, i.e. the first byte is a byte count and the next 15 bytes are the strings. Command storage is by channel, using addresses **140H** to **1BH** for channels 1 -> 8.

(Strings are only substituted if the first byte (the length byte) is non-zero. A zero length byte just sends the normal single source command.)

Uses for this function are to send special commands via the source buttons, eg 2D and 3D switching can be allocated their own "channels" and so no source commands are sent for those channels, just the substituted ones. The names for these dummy "sources" keys can then be customised in the normal way by editing their name fields at 090H, 0A0h, 0B0H and 0C0H.

## Serial EEPROM Edit: Use of SER0 and Docklight / Bray Terminal to load EEROM via macros

This function allows users to load the EEPROM locations discussed above for SER1 commands to switchers or SER1 commands as channel add-on strings or alternate strings. To use this, as serial connection is needed to a PC running Docklight or Bray Terminal (both available on line. See www.docklight.de , https://sites.google.com/site/terminalbpp/ )

To make a clearer display, in the "**Tools | Options | Display**" untick the "**Add the character description in the ASCII …**" select box. Also, in the "**Tools | Options | Date/Time Stamps**" screen, untick the "**Time stamp**" select box.

To use, Macros need to be defined for the commands to be executed, and these macros contain the data to be sent, as well as the leading address. The display command just needs the address of a 16-byte block).

Serial edit is entered by using a PIN number of 2000. Set the terminal program to 38400 8N1 and use SER0, the "Projector" port on the T460. The normal download cable can be used, but plugged into the first port Phoenix connector.

**Command list for Serial EEPROM Edit:**

(All commands start with a single capital letter **B, D, N, S, X**. All address information follows, if needed as 3 HEX digits in CAPITALS. Then follows a "**:**" as a separator from data, and one to 16 bytes of data. ASCII data is just typed a text. Binary data, eg byte count, i.e. enters as two HEX digits between arrows: <HH>. There is no terminator … because it is sent as a block from a macro, the T460R times out and stops loading when transmission ceases.

**D140** is a Display command, and shows 16 bytes in hex and ASCII  Anything in the EEPROM can be displayed in this way. The max address is 1E0. So to display the channel strings in sequence generate macros for D140, D150 … D1B0 for the 8 channels. **D070** and **D0F0** display the ON and Off commands for aux devices.

**E.g: for an Off command to a Kramer switcher, with a length of 8 bytes**

```
D0F0

 0F0h: 08 59 20 39 20 30 20 30 0D 00 00 00 00 00 00 00
ASCII:     Y sp  9 sp  0 sp  0 cr
```

NOTE: The Length byte in the above string (value 08) is a hex number, a count of eight bytes.

Similar macros are: **D090** to display the first saved user name, **D0C0** for the fourth.

**S140:<04>ABCD** loads a 4-byte **ABCD** command into Channel 1 locations with a count of **04** binary at the start.

(Note how non-ASCII data is loaded in <> brackets. Up to 16 bytes of ASCII and/or binary can be sent at once. The saved data is shown in red after the command is executed.

```
S140:<04>ABCD

 140h: 04 41 42 43 44 00 00 00 00 00 00 00 00 00 00 00
ASCII:     A  B  C  D
```

(Data after the 5th byte is ignored as the length is set to 4 bytes to send.)

**Another example:** Set the third channel message for an Epson to HDbaseT, "SOURCE 80<CR>", save a macro in Docklight (called "Channel 3 set Source 80") with data of: "S160:<0A>SOURCE 80<0D>" Note the length byte of "0A" is a value of "ten decimal" expressed as two hex digits.

The following is the command transmission, followed by the display of modified and saved data:

```
S160:<0A>SOURCE 80<0D>

 160h: 0A 53 4F 55 52 43 45 20 38 30 0D 00 00 00 00 00
ASCII: lf  S  O  U  R  C  E sp  8  0 cr
```

Note: The T460R standard setup actually has Kramer drive commands in the source string storage areas. As stated above, set the length bytes to <00> for the strings which are to be unchanged.

**Setting name strings: N1-N4 command, for loading 12-byte user names.** Spaces pad the name to 12 bytes.

**N1:ABDCEFGHI**

Eg:

```
N1:TigerCam

 090h: 54 69 67 65 72 43 61 6D 20 20 20 20
ASCII:  T  i  g  e  r  C  a  m sp sp sp sp
```

**B<0E>** Baud rate constant setting command: loads location 04F with a value from the table on Page 30 of this manual:

Eg: `B<0E>`

```
04Fh: 0E
```

**X** command exits from the editor back to run mode.

## *Eighteen ON presses:* Clone function, to copy Original setup to multiple Clone T460s

This command allows an Original T460, (after setting it up to a custom user configuration,) to clone its setup to the non-volatile memory of multiple T460s in a few seconds. **(Available only in release 2.58 and later.)**

Before use, it is necessary to connect an Original and a Clone unit together by cross-coupling the "Projector" SER0 ports on the two units. Just connect the Grounds together, and then the Tx0-Original to Rx0-Clone and Rx0-Original to Tx0-Clone. (Don't connect the CTS ports). (This cable is available from JED as part number **460-Clone).**

On the **Clone** unit, enter setup mode (with PIN number) and then push "Volume Up" (or left-yellow key) once to enter "**Clone Load**" mode and press "Volume Down (or right-yellow key) to run. Leave the unit powered and sitting in the following state:

```
Receiving
Off to exit
```

On the **Original** unit, enter setup with the PIN number and after 17 presses of **ON**, (or 2 of "Volume up") press **Vol Dn** to start cloning:

```
Clone T460
setup
```

then

```
Cross-couple
proj. ports
```

then

```
VolDn clones      (Returns to here for repeat)
Off exits         (OFF exits cloning process)
```

Pressing **Volume Down** starts the clone process and shows the block transfer process from address **000** to **1F0** taking 20 seconds. On the **Original**:

```
Sending
block:01A        (etc)
```

On the **Clone**:

```
Receiving
block:01A        (etc)
```

At the end, the **Original** will show a "**Cloned OK"** message and loop for a repeat, and the **Clone** will show a "**Clone done"** message and go back to the "**Projector ON to start**" point, but with the new projector, 461 setup, etc displayed on the way.

### *Nineteen ON presses:* Clone load (see above)

```
Clone load
Vol Dn acts
```

**(See clone function above, 17 presses)**

**Note: Holding OFF down for two seconds at the main menu screen will exit at any time.**

**Note:** At the end of a load, success will be indicated on both screens. However, a program fault on releases earlier than 3.10 did show an incorrect failure message on the Transmitter's screen after all 1F0 blocks were completed. However, even with this message, all data is transferred OK, so please ignore the message. (If it gets to 1F0 it will be OK).

## T461 remote audio attenuator

The T461 system receives commands from the T460 via the second serial port, and correct operation needs to have the audio control setup screen (see above) programmed to use the T461. If this is done, the serial commands control the T461 to select a channel and set its volume, as sources are changed and RUN mode entered. **Microphone level control in both Standby and RUN mode (via T461 audio controller)** is covered on Page 5 of this manual. **Special source "Mic.Vol.Set"** is discussed on Page 10. **FlagM** must also be set. (See page 16)

### Setting up the T461

The T461 needs stereo inputs to the input connectors for each input channel, and the stereo output fed to the system stereo audio amplifier. Use the screwdriver accessible pre-attenuators on the T461 front panel to balance the levels on each channel.

As a channel is selected by the T460, the corresponding LED on the T461 will light whenever that channel is selected with a volume setting greater than "0". When a channel's gain is adjusted down to "0" its LED goes out. As the source is selected on the T461, and assuming volume settings are greater than zero on each channel, the LED illumination will move through the channels in step with the projector/screen channel selection.

**Note: You must set the T461 channel allocations before use. See the "Set T461 links menu"** earlier in this manual.

### Wiring the T461

**NOTE: The Tx and Rx lines must cross over: Tx (transmit) from the T460 must go to Rx (receive) on the T461, and Tx from the T461 must go to Rx on the T460.** CTS is not used. 12 volt power from a T461 can power a T460.

If using CAT5 wiring, please use the following coloured wires for the listed functions, using the pairing shown:

| | | | |
|---|---|---|---|
| Brown | + supply feed via CAT5 | Brown/white | Ground to T461 |
| Blue | Tx from T460 to T461 Rx | Blue/white | Ground to T461 |
| Green | Tx from T461 to T460 Rx | Green/white | Ground to T461 |

### Relays outputs on the T461/462

RELAY1 and RELAY2 times can be set in the "Relay Times" command in the range of 0 to 60 seconds. (Setting a time of "0" seconds disables the operation of these relays.)

The operation of the relays is to control motorised screens, projector ceiling mount mirror or lowering devices and room house-light dimming, and video mixers. **NOTE: Relays are NOT rated for direct 240VAC switching. Use external interfaces.**

**Screen relays:** Relays 1 and 2 are used in four different modes:

- In "**Screen motor direct drive**" mode, Relay1 closes at the start to lower the screen and the motor actually runs programmed Relay1 time. Relay2 runs the screen-up motor at the end, for screen up for its programmed time.
- In "**Screen motor via Somfy ILT**" mode, times are still set, but Relay1 pulses for 1 second to start the screen-down motor, and pulsing both relays together stops the motor. Pulsing Relay2 at the end starts the "up" motor, and both together stops;
- In "**Screen motor single pulse"** mode, Relay1 pulses to start the "lower", and limit switch stops motion. Relay2 is pulsed to start the "up" motion, and again, a limit switch stops the motion. ScreenTechnics CONNECT card uses this protocol;
- In "**Screen Motor cls/dn, op/up"** (or "close/down, open/up") mode, closing Relay1 starts the screen down (stopped by a limit switch), and opening Relay1 starts the screen up, again, stopped by another limit switch. This is like the "Screen trigger" output of some projectors, and if the relay common goes to +12 volts, a 12-volt signal is available to the controller. (In this mode, Relay2 is closed at the start and opened at the end, and can be used for switching on audio power, etc

**Lifter control via Relay3:** at the ON time, Relay3 is actuated, and remains closed for the whole cycle. This can control projector ceiling mount mirror or lowering devices. This relay is turned OFF at the end, or can be delayed to after cool-down;

**Light Dimmer Control via Relay4:** When the projector/screen is warmed up and ready for a "show", Relay4 is operated, and stays ON. This signal can be used to dim the house lights for the show duration. (With CBUS enabled, this relay is just pulsed for 2 seconds to give the full dim situation). When OFF is pressed, Relay4 goes OFF, and the lights back to normal. If CBUS is selected, Relay6 is pulsed for 2 seconds to restore normal room lighting. Relay sets ½ dim.

If the Keyswitch, Option 2, is selected with Keyswitch-start (in "Security and Timer" menu), Relay8 is operated to turn on systems before the start menu is enabled, and it is turned OFF at the end of a show.

## System Wiring and Communications

A drawing showing "Wiring details for the T460 projector controller" is attached at the end of this manual and shows how the T460 is wired to a projector/screen that comes with a serial cable pinned with a female D9 (i.e. ready to plug into a "Standard" PC serial port). This includes most Epson, NEC and many others. Note how the CTS line from the T460 is used to enable serial in and out on quite a few projectors/screens, and is worth always wiring four lines as shown so future projectors/screens used don't need location rewiring.

**NOTE: There are many different wiring systems for the RS232 connector on projectors/screens, and you should always consult the projector/screen manual. It seems some make the D9 projector/screen RS232 look like a DTE (Data Terminal Equipment), and some make it look like a DCE (Data Communications Equipment). Data from the T460 is on the pin labelled "TX" in the drawings and on the board. This pin is driven at –9 volts and should go into the "RD" or "RX" input pin of the projector/screen. Some projectors/screens (eg. Hitachi CP-X935) use a 15 pin "VGA" style connector with a unique pinout. Others use an 3, 5, 6,7, 8, 9 or 12-pin mini-DIN, (although all have different pin-outs!)**

The line called CTS on the drawing, which is needed on some projectors/screens to enable serial in and serial out on some projectors/screens should always be at about plus 9 volts with respect to ground. This needs to be wired into pins on the projector/screen shown variously as **CTS** or **DSR**.

### Wiring using CAT5 cable

A popular cable available for reasonable price is known as CAT5 or Category 5 cable, used mainly for wiring between computers running an Ethernet network to an Ethernet hub. It consists of four pairs of wires, each pair consisting of a fully coloured wire and a white mate, twisted together. These are housed in an outer coloured sleeve.

We have successfully used 30-meter lengths of this, and looking at voltage levels, could probably go to twice this, even at 38400-baud rates. Power can be fed down the CAT5 cable, allowing a plug-pack up near the projector/screen to power the T460/projector/screen system, and saving a power-point having to be provided near the T460 on its wall or lectern. Voltage loss in 30m of cable is only 0.2 volts.

Because of the twisting scheme used, the following rules need to be observed:

Always use a twisted pair as a function, rather than use one twisted pair for both TX and RX. So, for standardisation, we suggest the following colour scheme:

Use the white wire of all pairs for the ground wire in each pair.

Use the following coloured wires for the listed functions:

| | | | |
|---|---|---|---|
| Brown | + supply feed via CAT5 | Brown/white | Ground to 2-pin power connector |
| Orange | CTS from T460 to proj.<br>*** **ALWAYS include to future-proof the installation** | Orange/white | Ground to Proj. RS232<br>This "ground" can also be used to bring back the PIR signal for people-sensing.<br>*** **ALWAYS include to future-proof the installation** |
| Blue | Tx from T460 to proj. | Blue/white | Ground to Proj. RS232 |
| Green | Rx from Proj. To T460 | Green/white | Ground to Proj. RS232 |

## Alternate projector/screen connections

Various other connectors are used on other projectors/screens; a separate diagram is made available for "non-standard" projectors/screens as they are added to the menu. Most projectors/screens have a connection diagram on the page that shows the control codes and other communication parameters.

## Dual projector/screen wiring (from one T460)

The first drawing (see second-last page of this manual) shows how an optional second projector/screen (#2) can be paralleled with the main one (shown as #1). Both projectors/screens have the same outgoing (TX) signals, but a reply is only wired from the #1 unit. Use the T460 in non-reply mode, so that both projectors/screens get the time-controlled signals rather than the possibly shortened times which "reply" mode supports.

**NOTE: Some projectors, eg certain recent NEC models, cannot be used in dual projector mode as the must be used ONLY in "Reply" mode.**

## Troubleshooting communications

It is possible to check the wiring with a multimeter to determine whether it has a chance of working. With most projectors and screens (LCDs and Plasmas) we use two-way communications for the initial poll of whether the projector is communicating (or not), even if we are not actually operating the system in "reply" mode. At the start of a cycle (or when BOTH yellow buttons are pressed AT THE SAME TIME) the projector/screen is polled for an expected reply, usually with a "Read power status" request, (or sometimes with a "Power Off" command, from which we expect an acknowledgment of some sort.) When wired to a projector/screen that does not reply, only outgoing communications from the T460 are needed, and we cannot determine the projector/screen status and show the "Projector comms OK" message. The voltage level on the outgoing line to the projector/screen should be about minus 9 volts with respect to the ground pin. The reply line from the projector should also be at about minus 9 volts, if used. The CTS or DSR pins should be at +9 volts on the projector (if used).

If you get a "**Projector not replying**" (etc) message, it indicates a communications problem, and you should trouble-shoot this before proceeding further.

(This is where the T466 LED communications tester is useful: it shows the rest levels for both directions of communications by showing both Green LEDs glowing). Then when the T460 sends out a command or request to the projector/screen, the Red LED flashes, and when the projector/screen replies or acknowledges, the yellow LED should flash.)

**Voltage test:** If you only have a multimeter to hand, check –9 volts on BOTH the T460 -> projector/screen AND the projector/screen to T460 return line. Only measuring –9 volts on ONE line and near zero on the other probably indicates:

1. Only one line is connected between the T460 and projector/screen and the other is open; or
2. The TX and RX lines are reversed.

Note 1. On some projectors (eg some Epsom and NEC, the signal from the projector can be as low as –4 volts.) Some recent units have a clamp diode across one or both lines, so voltages range from -0.7 to +5.5 volts.

Note 2. Also, on some types which don't allow a "Projector comms OK" message, there is NO voltage on the reply line until after the projector/screen is started. Once these units have started, a voltage can then be measured on the reply line. These projectors/screens DO NOT DO THE REPLY TEST, and the lamp time display only occurs at the end of the "warmup" time.

**Resistance test:** Check connection to projector input by using multimeter in resistance (K-Ohms) range and measure resistance to ground of projector receiver input line. This should be in the range 4K to 7K ohms. Less may be a short, high resistance may be an open circuit. As a last resort … disconnect both ends and check there is no short (0 Ohms) between any lines.

## Dual T460 controller wiring and setup

### (Not available with the T464 Ethernet configuration)

With release 1.42 it is possible to interconnect two T460 controllers in a Master/Slave configuration, with or without a T461. The inter-wiring is as follows:

A **Master T460** is wired to the projector/screen via Serial port 1, the usual projector/screen RS232 port, using normal serial wiring.

If used, a **T461** is wired to the Master T460, Serial port 2, RS232 interface, using normal T461 to T460 serial wiring as shown in the wiring drawing following.

**Two T460s** in a dual system are interlinked via the RS485 interface. This is the next connector to the left of the Serial port 2, RS232, used for the T461. It has three connections, **A**, **B** and **Com.** The wiring connects these two connectors in parallel. (I.e. **A** on both, **B** on both and **Com**. on both are paralleled.) The **A-A** and **B-B** lines should be a twisted pair. The **Com**. is duplicated in Blue/White. If a CAT5 cable is used, the following table shows suggested wiring.

The **Power** connections of the two T460s should be connected in parallel. Power for the remote T460 can be fed down the same CAT5 cable as carries the RS485 Master/Slave communications.

| | | | |
|---|---|---|---|
| Brown | + 12 supply feed via CAT5 | Brown/white | Ground to 2-pin power connector |
| Orange | "**A**" signal between T460s | Orange/white | "**B**" signal between T460s |
| Blue | "**Com**" signal between T460s | Blue/white | "**Com**" signal between T460s |
| Green | N/C | Green/white | N/C |

## Setup of T460s on dual-controller mode

The two T460s have each to be setup appropriately for the Master and Slave modes as follows:

- The **Master T460** is set for the projector/screen of choice, source channels are set, the audio system is selected (projector/screen or T461), "Run-time" is set, T461 channels are set, all as a normal setup. **The special setup for master T460 mode is to set FLAG8 in the flag setting menu**. This sends all messages to the T460 local LCD screen down the cable to the Remote T460. It also merges keystrokes from both the remote and local keyboards, and uses them as if local;
- The **Remote T460** is set from the "Set Proj." menu in setup. The option selected is "Remote term". This sets a T460 up to receive coded screen messages from the Master T460 and display them. It also scans the Remote keyboard and sends the codes to the Master on demand. (No other options are set on the remote.)

If the system is interconnected, the Master will test the link to the remote as part of the startup and show:

```
Remote
connected OK
```

if the link is OK, or if not:

```
No remote
found
```

if the link if not working.

After startup, both T460s show the same:

```
Projector
ON to start
```

From this point onwards, either controller can be used for any function as if it were the only T460 in control, from ON, changing sources, setting audio volumes, to turning OFF.

Both the Master and the remote still detect OFF and ON pressed together and prompt for PIN number to enter "Setup" mode, (when at the "Projector ON to start" (etc) display point.) The Master will also detect VOLUME UP and VOLUME DOWN pressed together and restart, which can be used as a quick test of system status, including testing that the remote link is OK.

Note: Due to timing considerations on the communications path between units, no auto-inc/dec is available in 2-T460 mode.

## T462 -R2 (dual) and -R4 (quad) RS232 relay actuator for screens, etc

This device plugs into the T460 second serial port (J4) (the same place the T461 plugs into). This is driven by the T460 and the relays are setup and operated in the same way the T461 relays operate. Relays 1 and 2 are used for screen down and up, and the optional relays 3 and 4 are used as projector "down" and "lamp dim". The screen up/down times are setup via the "relays" menu as a setup menu item above.

Suggested wiring for the T462 from the T460 is shown in a drawing at the end of the manual.

**NOTE: The Tx and Rx lines must cross over: Tx (transmit) from the T460 must go to Rx (receive) on the T462, and Tx from the T462 must go to Rx on the T460.**

If using CAT5 wiring, please use the following coloured wires for the listed functions, using the pairing shown:

| | | | |
|---|---|---|---|
| Brown | + supply feed via CAT5 | Brown/white | Ground to T462 |
| Blue | Tx from T460 to T462 Rx | Blue/white | Ground to T462. |
| Green | Tx from T462 to T460 Rx | Green/white | Ground to T462. |

The T462 is polled in all modes selected in the "Audio/Mute" menu EXCEPT the T461 modes, as the T461 does the relay functions if selected. A message during startup:

```
JED 462R OK
```

shows that the T462 is connected and responding.

**A T462-R4–H** version is available which is internally decoded for relays 4 to 8, (rather than the normal 1 to 4), so T462's can be used in a pair (one without and one with the –H code) if a pair of T462s drive screens, lifts, and video switcher(s).

If two T462-R4 units are used, connect the TX and RX lines of the first one ONLY to the TX and RX lines of the second Com. Port of the T460. ONLY connect the RX line of the second T462R4-H, so there is no clash of two RS232 drivers.

## T462 -R2 (dual) and -R4 (quad) RS285 relay actuator for screens, etc

An RS485 version of the T462-R2 and –R4 is also available. This allows simultaneous use of the screen and mechanical / lighting control features of a T462 while freeing the second RS232 serial port of communications to a mixer, scalar or switcher. (e.g. Kramer, Extron, etc) or a second display device operated via the second RS232 channel.

This device plugs into the T460 RS485 port (J3). This is driven by the T460 and the relays are setup and operated in the same way the T461 relays operate. Relays 1 and 2 are used for screen down and up, and the optional relays 3 and 4 are used as projector "down" and "lamp dim". The screen up/down times are setup via the "relays" menu as a setup menu item.

To connect to the T462 via RS485 it is necessary to configure communications to it as the first item in the "Set relays" menu, where the user is shown:

```
Relays via
461/2->RS232
(or)
462R->RS485
```

The options are toggled between with the "Volume Up" key. Select "RS485" and selected by press "Volume Down". Then proceed as normal to select screen modes, times, drop functions and lights dimming functions.

After exiting the setup menu, the start-up message shown on the T460 screen when it detects the presence and correct connection to the T462-RS485 is:

```
JED 462R OK
(via RS485)
```

The **Power** connections of the T460 and the T462-RS485 should be connected in parallel. Power for the T462 can be fed down the same CAT5 cable as carries the RS485 Master/Slave communications.

| | | | |
|---|---|---|---|
| Brown | + 12 supply feed via CAT5 | Brown/white | Ground to 2-pin power connector |
| Orange | "**A**" signal between T460 and T462 | Orange/white | "**B**" signal between T460 and T462 |
| Blue | "**Com**" signal between T460/T462 | Blue/white | "**Com**" signal between T460/T462 |
| Green | N/C | Green/white | N/C |

# T460 controller to Australian Monitor (Hills) IN400 wiring

**(Not available with the T460 to T460 Master/Slave dual controller. )**

With release 3.06 it is possible to interconnect the T460 with a Hills IN400 eight-channel audio controller/VGA and Composite Video switcher.

Note: the second RS232 connection on the T460 is still available (it is multiplexed in the T460 hardware) so it can be used to operate relays for screen, dipper or lighting control in external T462 boxes (one or two). Relays selected by channel can also still be used, and channel redirection can be set up for relay-switched channels as well as IN400 switched channels using the new "T460 to projector mapping" menu.

T460 to IN400 communications uses the RS485 connection via the three-pin Phoenix connector to the left of the Serial Port 2. It has three connections, **A**, **B** and **Com.** This is wired to the lower green Phoenix screw terminals on the back of the IN400.

If a CAT5 cable is used, the following table shows suggested wiring. Note that the signal lines should be wired using a twisted pair eg Orange/Orange-white. A ground wire (using another colour) is needed between units using the third connection.

| | | | |
|---|---|---|---|
| Brown | n/c | Brown/white | Ground on T460 to Ground on IN400 (Earth symbol at right of connector) |
| Orange | "**A**" signal on T460 to "+" on IN400 RS485 input | Orange/white | "**B**" signal on T460 to "-" on IN400 RS485 input |
| Blue | n/c | Blue/white | n/c |
| Green | n/c | Green/white | n/c |

# Reprogramming the Tiger microprocessor in the T460

If it is desired to re-program the Tiger CPU to update the software, a serial download cable is needed, a laptop computer containing the Tiger download program, and the binary version of the released software.

The serial download cable connects the PC serial port to the 4-pin connector on the back of the T460 labelled as "2nd RS232". (This is the connector usually used for the T461 serial cable.) Only Rx, Tx and Gnd connections are needed. (CTS is a No-Connect)

The connections to a female D9 to the computer serial port are:

| T460 serial port 2 connections | D9 serial port connection to computer |
|---|---|
| Ground | Pin 5 |
| Tx | Pin 2 |
| Rx | Pin 3 |

## Installing the software

Install the Tiger Downloader 2.03 English in the default directory by executing the program **TigerDownloader2.3English.exe** from a floppy disc or download and move an icon for it onto the desktop. A link to download this is on the JED site at http://www.jedmicro.com.au/projector_controllers.htm

**Note: A Downloader version is now available from the JED site which can drive higher-numbered serial ports, eg. on a laptop via a USB/Serial port converter and Serial Port emulator. Instructions for use of this are on the site, too.**

You will need to know the com port number of a USB simulated port, and set this into the downloader setup under Options|Communications|Port.

Move the current release of the T460 program into a suitable directory (say, C:\T460 ) on your computer's hard disk, called T460Vxxx.tgu. This file is also available on a floppy, called "T460Vxxx.tgu" The numbers after the V are the version number and will change with each release.

## Doing the download

1. Connect the cable made up as above between your computer's serial port and the 2nd serial port of the T460;
2. Apply power to the T460;
3. Switch the little yellow switch labelled "Prog" in the ON arrow direction (towards the green projector/screen cable connector socket) and leave it there;
4. Switch the little yellow switch labelled "Reset" to the ON position and then OFF again. (The hooter should be sounding continuously at this moment);
5. Open the Downloader program. You may need to set up the communications port to be used. Set this to match the connection you have made to the Downloader cable;
6. Check that communications have been established by clicking on Status | Module, or typing CTRL M on the keyboard. This will show the Tiger status and the last version loaded into the Tiger microprocessor in the T460. If no communication is established a warning screen will show that communication is not established, and so you should check the cable, switches, the port selection and power ON status.
7. Use the Program | Download (or F2 function key) to start reprogramming, and select the file "T460Vxxx.tgu" file from the C:\T460\ subdirectory. Programming will then take place, with a bar graph showing progress. (x.xx is the version number)
8. When it reaches 100%, **switch both yellow switches on the T460 OFF**, and then switch the Reset switch ON then OFF again.
9. The tone should then stop, and the screen should then show the new version number and normal "Projector ON to start" (etc) message.
10. Reconnect the 2nd serial port to the T461 (or T462) box (if used).

Reprogramming is now complete.

## Release version number (update history):

V1.00 Hitachi CP-X980/985 first release 14 Mar 2002
(Block of old revisions deleted from 20 June 2004)

V3.62 Add HIT_GENERIC_LCD_1, NEC_E_SERIES 30 Mar 2014

V3.63 Add NEC E-SERIESx1, NEC E-SERIESx5, TWO-TOUCH, C-TOUCH
Add EPSON EB-570, EB-575W/i, EB-580, EB-585W/i, EB-590WT, EB-595Wi 14 Apr 2014

V3.64 Add variable length volume string for Optoma 28 Apr 2014

V3.66 Add Panasonic PT-VW440E, PT-VX510E, PT-LW330, PT-LW280, PT-LB360, PT-LB330, PT-LB300, PT-LB280, PT-AE8000EH, PT-AT5000E, PT-AT6000E, PT-LW25HE, PT-TW240E, PT-TW330E, PT-TW331RE, PT-TX300E, PT-TX301RE, PT-CW331RE, PT-CW241RE, PT-CX301RE, PT-DZ13KE, PT-DS12KE, PT-DW11KE, PT-DZ10KE, PT-DZ16K_D_E_U, PT-EZ770Z, T-EW730Z, PT-EX800Z, PT-VW340Z, PT-VX410Z, PT-VW345NZ, PT-VX415NZ, PT-VX42Z, PT-DZ870E PT-DW830E, PT-DX100E, PT-EZ580, PT-EW640_L, PT-EX610, PT-EW540, PT-EX510, PT-RZ475 24 Jun 2014

V3.67 Add NEC M282X, M302WS, M322W/X, M332XS, M352WS, M362W/X, M402W/X, PA522U, PA572W, PA622U/X, PA672W, PA722X 29 Jun 2014

V3.69 Add HDMI1 PC and HDMI 3 and DisplayPort to Samsung LCD
Add Hitachi CP-AX2503, CP-AX3003, CP-AX3503, CP-AW2503, CP-AW3003, CP-EW/EX250N, CP-EW/EX300N, CP-DW25WN, CP-D27WN, CP-D32WN. Add Vivatek range 4 Jul 2014

V3.70 Add Epson EB-99, EB-1970W, EB-1975W, EB-1980WU, EB-1985WU, EB-1420Wi, EB-1430Wi add Epson EB-421i, EB-426Wi, EB-431i, EB-436Wi add Optoma Generic:
Gen1:1/0 V10, Gen2:1/2 V10, Gen3:1/2 V15, Gen4:1/2 V16, Gen5:1/2 V20 10 Sep 2014

V3.72 Add SONY VPL-F420HZ, VPL-F720HZ, VPL-FHZ55, VPL-FHZ700, Sound-on FLAGQ 1 Oct 2014

V3.73 Add processing for Kramer 773 etc with toggle power mode using loc 0BFh as char count/flag
If zero assume discrete On and Off. If this > 00h assume 070h is common On and Off command and 0F0h is a status request and if reply is < BFh number assume power off and send from 070h. If > BFh assume it is already on.
Add absolute audio with "-" sign and offset, and variable length numerals in volume.
using location 0CFh KRAMER_VOL_OFFSET (Signed Offset to multiple of VOL_MAX and VOL_MULT.)
Add: Panasonic, PT-RW630, PT-RZ670, PT-VW530, PT-VW535N, PT-VX45, PT-VX60, PT-VX405 PT-VX501, PT-VX600, PT-VX605N, PT-VZ570, PT-VZ575N
Moved: Panasonic PT-VW430E, PT-VW431D, PT-VW440E, PT-VX500E, PT-VX510E, PT-VW330E, PT-VX400E, PT-VX41, PT-CW330E, PT-CX300, PT-CW240, PT-CW331RE, PT-CW241RE, PT-CX301RE, PT-LX270, PT-LX300, PT-LW321, PT-LW271, PT-LX351, PT-LX321, PT-LX271 2 Dec 2014

V3.74 Modify Samsung driver so all strings have byte 3 set to 0FEh (was 0FFh) so commands are recognised by all daisy-chained units in a multi-display configuration 5 Dec 2014

V3.75 Add new NEC LCD V322, V423, V_X463, P_V_X552, V652, P702, V801 Fix unmute E series and std and fix USB source for E-Series 12 Jan 2015

V3.76 Add BenQ LCD: RP550+, RP551+, RP650+, RP651+, RP700+, RP840G
Add DVI-A and DVI-I to Optoma via FLAGJ/K 2 Feb 2015

V3.77 Add NEC LCD X464UN_UNV, P553, X554UN_UNS, P703, HDbaseT to Epson EB-G6900 etc 4 Feb 2015

V3.78 Drop lots of old Hitachi's. Add Hitachi CP-X9110, CP-X9111, CP-WX9210, CP-WX9211, CP-WU9410, CP-WU9411, CP-WU8460, CP-X8170, CP-X4030WN, CP-WX3530WN, CP-WX/X4022WN, CP-X5022WN, CP-WX8265, CANON LV8235UST, NEC UM301W/X, UM351W, UM361X, PA521U, PA571W, PA621U/X, PA671W, PA721X, PX602U/W 14th Mar 2015

V3.80 Add Optoma W316, Reply mode on Panasonic proj, EPSON EB-W28,
Ch 5 command USB Display on NEC (FLAGK = 1)
Epson: IF (FLAGJ = 1) AND (FLAGK = 0) Select Ch 4 command SCREEN MIRROR
Epson: IF (FLAGJ = 0) AND (FLAGK = 1) Select Ch 4 command USB Display 27th Mar 2015

V3.81 Add Philips BDL 1.86 codes, 1.88 codes (with address byte) Whiteboard on Epson 15th Jun 2015

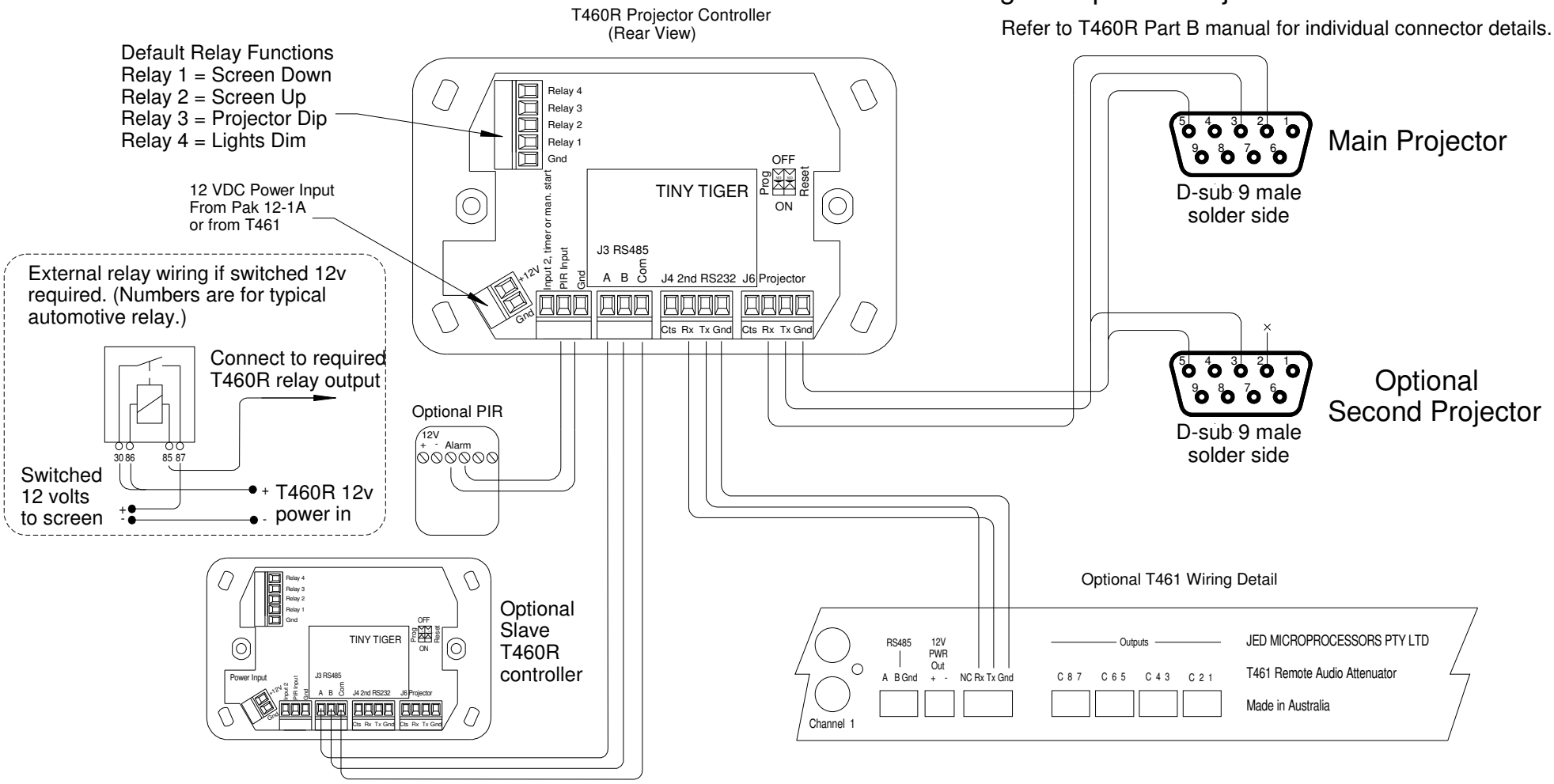
V3.82 Add Christie Generic E,G: E series: DHD675-E, DWU675-E, DHD775-E, DWU775-E,
G series: DHD550-G, DWU550-G, DWX600-G, DHD600-G, DWU600-G 24th Jun 2015

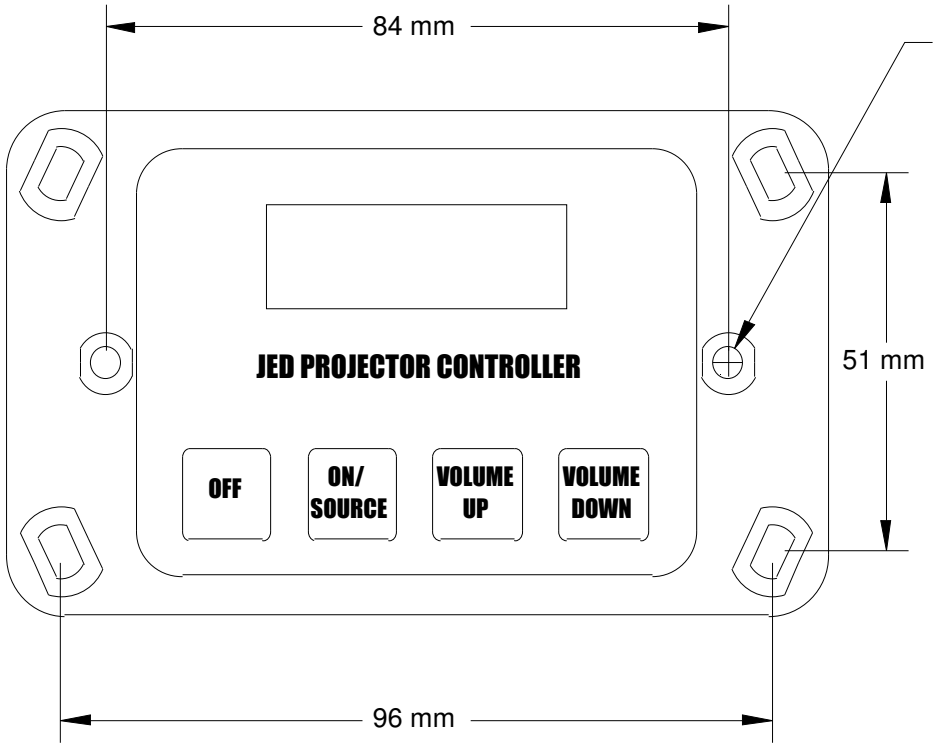
V3.83 Add Samsung HG special for SAMSUNG HG to keep TV looking for commands, uses FlagU

V3.84 Add FlagV for sub of Plug In Module for Samsung LCD on Ch 8 9th Sept 2015

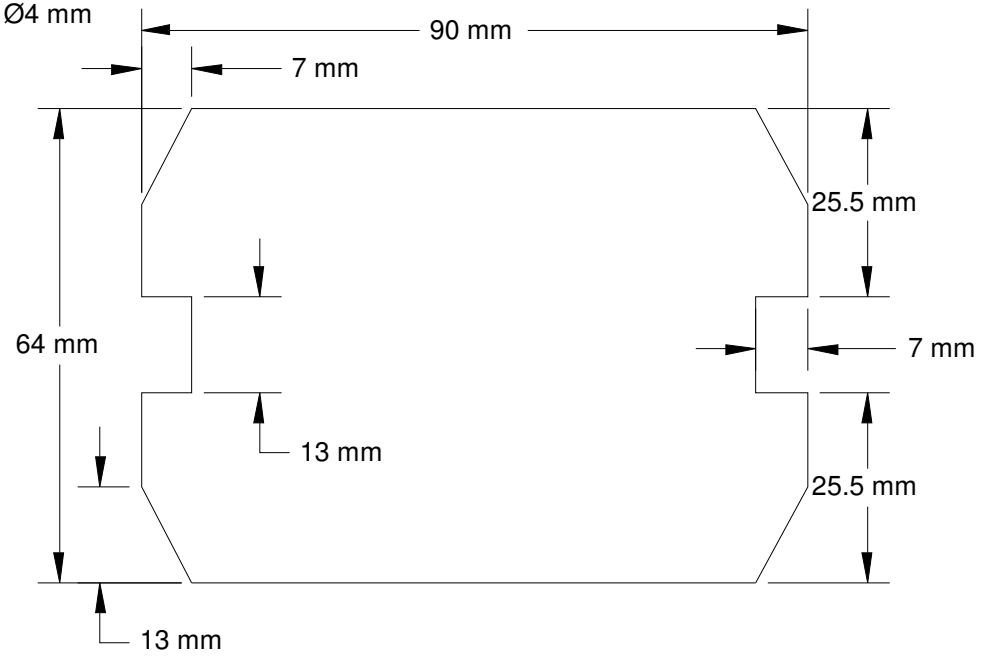
# Wiring example for Projectors with D9F connectors.

Refer to T460R Part B manual for individual connector details.






Mounting Hole Detail




Panel Cutout Detail
(When not using optional Clipsal 2000MB mounting block)

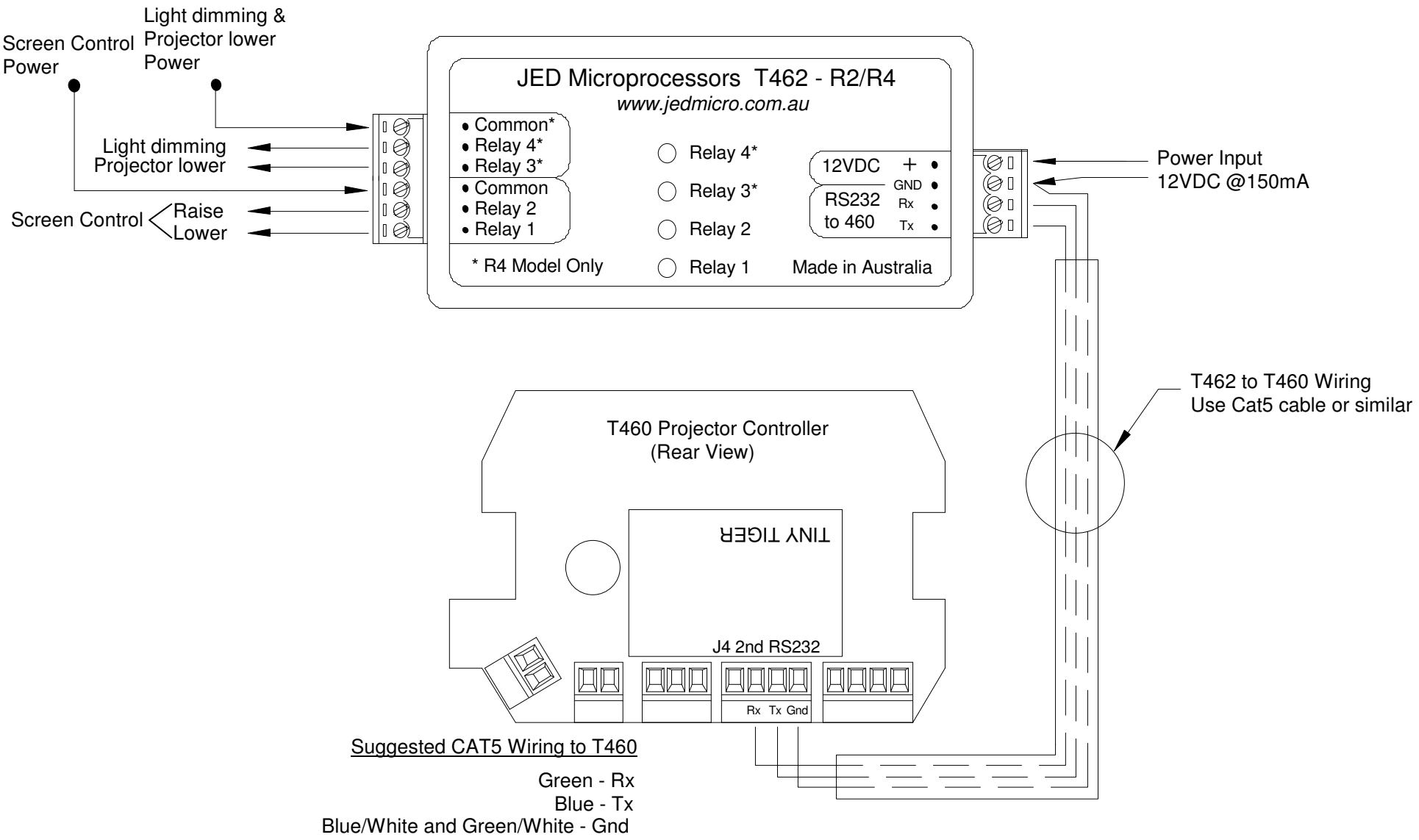
JED MICROPROCESSORS P/L
173 BORONIA ROAD
BORONIA 3155
AUSTRALIA
PH (03) 9762 3588

TITLE

# J460 Projector Controller Mounting Details

| SIZE | CAGE CODE | DWG NO | REV |
|---|---|---|---|
| A4 | | J460-2 | 1.0 |

| SCALE | | SHEET |
|---|---|---|
| FULL SIZE | | 46 |




| NO | DATE | DESCRIPTION | BY |
|---|---|---|---|
| 1 | 29/7/04 | Original | RN |
| | | | |
| | | | |

JED MICROPROCESSORS P/L
173 BORONIA ROAD
BORONIA 3155
VICTORIA AUSTRALIA
www.jedmicro.com.au

CLIENT

PROJECT

TITLE: T462 Wiring Detail

ENGINEER

DRAWN

DATE: 29 July 2004

SCALE

FILE NAME

DRAWING NUMBER

SHEET NUMBER: 47